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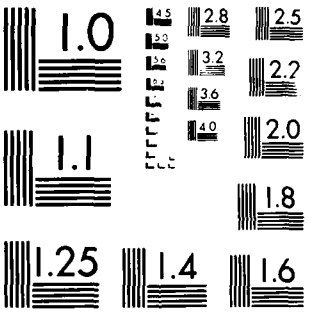

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AN EXAMINATION OF COMMUNICATIONS EFFICIENCY IN THE DISPERSED DIVISION TACTICAL OPERATIONS CENTER

THESIS

Presented to the Faculty of the School of Engineering
of the Air Force Institute of Technology
Air University
In Partial Fulfillment of the
Requirements for the Degree of
Master of Science in Operations Research

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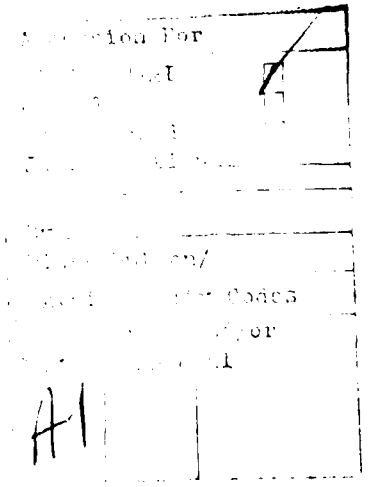
Preface

The importance of division tactical operations center (DTOC) survivability on the modern battlefield cannot be overestimated. Dispersing the DTOC is one method by which increased survivability can be obtained. The purpose of this study is to evaluate the effects the dispersed DTOC configuration has on message processing time and radio telephone operators. In conducting the study, operation of the DTOC's communications system was simulated for thirty days.

I wish to gratefully acknowledge the assistance and efforts of the people who helped make this project possible: CPT Paul Holland from Fort Leavenworth, KA, who provided many of the resources and initial guidance on the conduct of the study; MAJ Albert Garcia from Wright-Patterson AFB, OH, for his professional guidance on DTOC operations; and MAJ Daniel Reyen, my thesis advisor, for his continuing patience and assistance. Finally, I wish to thank my wife, Kyle, for her understanding and continual support throughout the course of this project.



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Abstract

This investigation determined the effects dispersing the division tactical operations center has on message processing time and radio telephone operator usage. The impact of dispersal distance and communications hardware are studied.

The analysis was accomplished by modeling division tactical operations center operations using SLAM, a special purpose simulation language, with FORTRAN inserts. The results of the study regarding the impact of dispersion was compared to similarly generated results of the present consolidated division tactical operations center.

CHAPTER I

Introduction

General

Historical Perspective. The size of United States Army division staffs has increased from the time of the Civil War to the Vietnam conflict primarily because of the complexity of modern warfare (5:1-2 - 1-3). The continual increase in the amount of equipment and lethality of weapon sytems has resulted in the dispersion of divisional units over an ever larger geographic area. Additionally, the speed with which these units can move has dramatically increased. Therefore, more people and equipment were assigned to the division staff to assist the division commander with command and control of these units.

Up to and including World War II the division staff operated from a single command post on the battlefield. However, during the post-World War II years concern about tactical nuclear warfare in Europe resulted in the first echelonment of the division command post (5:1-2). Echelonment is placing elements of the division command post at separate locations on the battlefield. During the Vietnam conflict the division command post operated from permanent or semi-permanent facilities (5:1-3). This resulted in elaborate, immobile command posts.

Presently, the division command post is echeloned into

the division tactical command post (TAC CP), the division main command post, and the division rear command post (4:7-12). The division TAC CP operates forward, in the main battle area, from a position where it can most effectively control current operations when it is activated (4:7-16). The division main command post operates toward the rear of the main battle area and serves as the division tactical operations center (DTOC). The DTOC consists of the division general and special staffs plus other selected activities. The DTOC is the division's sustaining command post and is concerned with current and future division operations (4:7-12). The division rear command post is located in the division support area. The division rear command post is primarily responsible for administration and logistics (4:7-17). An example of where these three echelons of the division command post operate within the division area is illustrated in Figure 1.

Situation. The Middle East conflicts during the 1970's illustrated the vulnerabilities of the division tactical operations center (DTOC) (6:1-3). Large, immobile division tactical operations centers were easily identified and attacked. Also, they lacked the mobility to keep up with the battle during fast moving situations. The Israelis copied their DTOC configuration from the United States Army. Therefore, a great deal of concern has been generated within the United States Army regarding the vulnerability of its DTOC configuration. One decision has already been

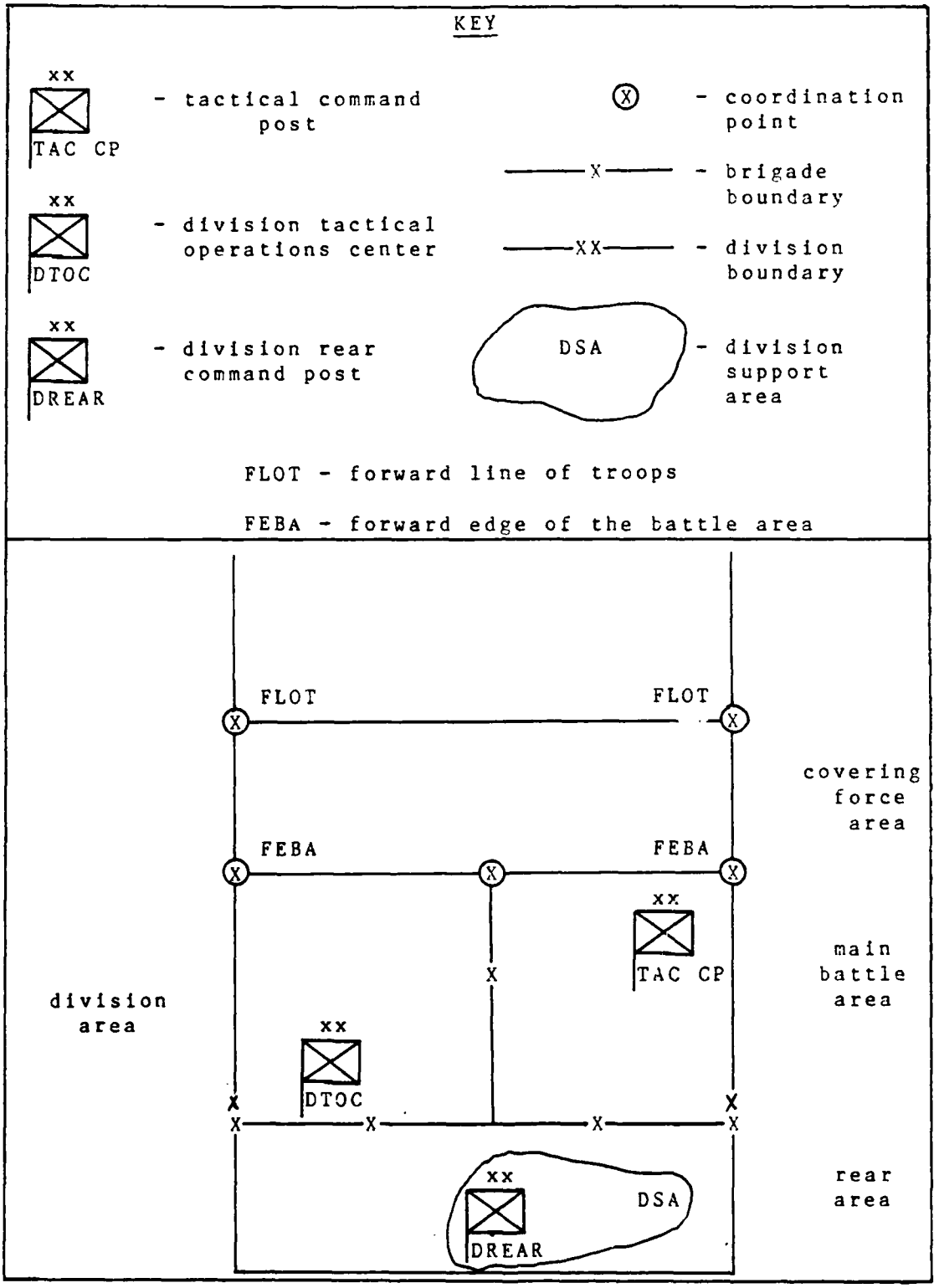


Figure 1 - Example of Division CP Locations in the Defense

implemented to correct this problem. This was to reduce the number of personnel in the DTOC, through standardization, in order to decrease its size and increase its mobility. Additionally, the Combined Arms Combat Development Activity (CACDA) requested that the Combined Arms Operations Research Activity (CAORA) conduct a study to determine the optimal DTOC configuration (1; 16). These agencies are located at Fort Leavenworth, Kansas. As a result, CAORA directed the Command Control Analysis Division, a subordinate element, to perform this analysis. The alternative configurations are to be evaluated in terms of survivability and effectiveness (16:1).

One of the most promising alternative configurations for the division main command post is dispersing the functional groups of the DTOC to increase its survivability. The functional groups or cells of the DTOC are command, current operations, fire support, combat service support, plans, and intelligence (6:166). There are three reasons this alternative is promising: it does not require a basic reorganization of the DTOC, it does not require additional personnel, and it requires only a minimal amount of additional equipment. The minimum amount of dispersion required by this configuration is 500 meters. This assumes the enemy allocates a battery of multiple rocket launchers to the destruction of a division command post (6:4-4). The additional equipment needed for this configuration would be six secure , frequency modulated (FM) radios. These radios

will enable the dispersed functional groups or cells to share mission essential information. Wire communications can not be used for this purpose since it would severely restrict mobility due to installation and retrieval time. Also, multi-channel radios can not be used because of the large electro-magnetic signature they produce (6:4-4). An example of the personnel and their utilization during continuous operations is shown in Appendix A.

Background

Two studies have been conducted which concern the dispersed division tactical operations center (DTOC). The first study dealt with survivability (20). In this study, survivability was determined by multiplying the probability of detection for the alternative DTOC configuration by the probability of damage given detection. The study concluded that the dispersed configuration significantly increased the survivability of the DTOC over the present consolidated DTOC configuration. This report was quantitative, well documented, and comprehensive. The second study dealt with effectiveness (8). Effectiveness in this study refered to whether or not the principle staff officers thought they could accomplish their missions in the dispersed configuration. Effectiveness was measured by an opinion poll of the division command group and principle staff officers. The result of this study stated that there was not a significant difference between the consolidated and dispersed

configurations with respect to the respondent's ability to perform their missions. However, this study did not specifically address the dispersed DTOC's effect on either the radio telephone operators or message processing time. Therefore, further studies need to be conducted which concern the effectiveness of the dispersed DTOC to determine if this is a practical alternative to the consolidated DTOC. The configuration chosen could have a profound effect on the outcome of any future conflict with a sophisticated enemy.

Problem

critical factor in the effectiveness of the dispersed division tactical operations center (DTOC) is the flow of information between the cells. In the consolidated configuration information received by any cell is immediately available to all others. This is not the case when the DTOC is dispersed. In the dispersed configuration, this information will have to be retransmitted by the receiving cell to all concerned cells. This will affect the communications operators and message processing time. The specific problem to be addressed is:

> What effect does dispersing the division tactical operations center (DTOC) have on the radio telephone operators and message processing time; presently, and in the future?

It should be noted that effectiveness of the DTOC in this study concerns communications efficiency and feasibility. Effectiveness as determined by what the division commander and his staff does with this information will not be addressed.

Objective.

The principle objective of this research is to provide the Command Control Analysis Division with a statistical analysis of the effects the division tactical operations center configuration has on the radio telephone operators and message processing time. This will enable the decision maker to decide whether dispersing the DTOC is feasible, presently or in the future.

Sub-objectives. The sub-objectives of this research effort are:

1. Identify the critical radio telephone operator(s) within the division tactical operations center.
2. Determine when critical radio telephone operator(s) saturation occurs.

Hypotheses

There are two hypotheses to be tested by this research effort:

1. Dispersing the division tactical operations center (DTOC) will not have an adverse effect on message processing time.

2. Dispersing the DTOC will not have an adverse effect on the radio telephone operators.

CHAPTER II

Methodology and Measures of Effectiveness

Methodology

Two methodologies have been investigated as possible techniques for evaluating the impact division tactical operations center (DTOC) configuration has on radio telephone operators and message processing time. These are:

1. Network Analysis.
2. Simulation.

These methods are reviewed below.

Network Analysis. One methodology is to model this problem as a network consisting of nodes and branches. This methodology is considered because it has been applied to both information theory (13:232) and command, control and communications system analysis (1:385), both of which are related to the problem under investigation. An example of a network analysis model of the consolidated DTOC is shown in Figure 2. The source node represents the reports entering the system from the principle staff elements of the division's subordinate or superior units. The intermediate nodes represent the intelligence/operations radio net and the division message center. The sink node represents the consolidated DTOC. Each arc is assigned a capacity based upon distances, transmission time and frequency. To model the dispersed DTOC configuration, a series of networks must

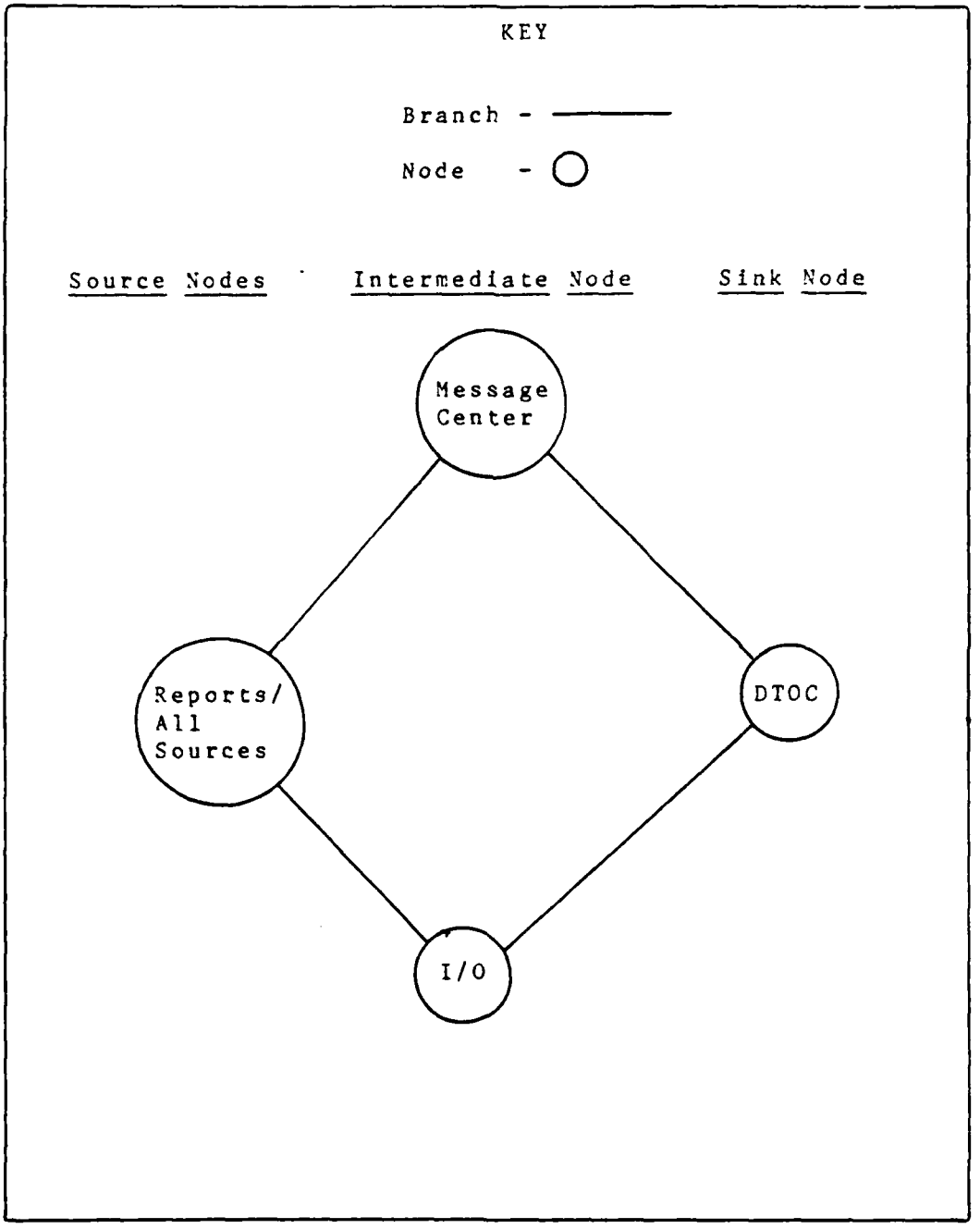


Figure 2. Network Analysis Model

be studied with each network based upon different communications hardware and internal DTOC retransmission rules.

The major drawback associated with this approach is the numerous simplifying assumptions required to make the problem fit network analysis techniques. Additionally, acquiring the necessary data to accomplish the stated objectives would be extremely difficult. Therefore, a more efficient and flexible approach is desired.

Simulation. Careful examination of the problem revealed that comparing DTOC configurations is a very complex issue that does not lend itself to an analytic technique such as network analysis. Additionally, this study is not concerned with finding an optimal solution to the problem. Rather, it is concerned with providing to the decision maker information describing the operation of the system and effects of dispersing the DTOC in terms of individual components of the system.

Simulation is just such an approach. Simulation imitates the operation of real-world processes over time. The system is studied by developing a simulation model. This is an expression of the real-world system in terms of mathematical and logical relationships between the objects of interest (19:2).

The availability of special-purpose simulation languages, such as SLAM, makes simulation attractive as an analytical tool (19:2). Additionally, simulation requires

fewer simplifying assumptions than other analytical methods, such as network analysis (17:4).

Conclusion on Methodology. After reviewing network analysis and simulation, it appears that simulation is the better alternative. Furthermore, the availability of a special-purpose language and computer resources for this study will facilitate the development of a mathematical model which adequately portrays the real-world system under investigation.

Measures of Effectiveness.

Measures of effectiveness are those response variables selected which best demonstrate the essence of the study. In searching for these measures of effectiveness, several were considered:

1. Number of reports processed.
2. Time it takes to process a fixed number of messages.
3. Average message processing time.
4. Maximum message processing time.
5. Average operator utilization (percentage).
6. Critical operator utilization (percentage).

Each of these measures is important in its own right and data can be obtained for each using the simulation model. However, it is important to choose only those which best support the objectives of the study.

The number of reports each division tactical operations

center (DTOC) configuration can process in a specified time period might be a very valid measure of effectiveness in many cases. However, even though it would provide a relative comparison of the different configurations it would not serve the purposes of this study. This study is concerned with the effects each DTOC configuration has on the radio telephone operators and message processing time.

Likewise, the time each DTOC configuration would take to process a fixed number of messages does not serve the purposes of this study. This measure would provide the same comparison of each DTOC configuration as the previously mentioned one, but on a basis of time instead of a number of messages.

The average time it takes each configuration to process a fixed number of messages over a fixed time period is a very valid measure of effectiveness. This measure provides a comparison of the effectiveness of each DTOC configuration. It also provides an indicator for the decision maker as to the time environment in which he will be operating under the proposed configuration. In other words, how up to date is the information upon which he will base his decisions?

The maximum amount of time it takes to process a single message within each DTOC configuration may also be an interesting measure of effectiveness. However, it may not provide an accurate comparison of the differnt DTOC configurations because the most efficient configuration may also have the single, maximum message processing time.

The average utilization of radio telephone operators might be a very valid measure of effectiveness for comparing the various DTOC configurations. This measure seems to support the objectives of the study; however, it ignores the impact DTOC configuration has on the critical operator. For example, the radio telephone operator working in the plans cell of the DTOC may be working continuously while the radio telephone operator working in the fire support cell of the DTOC may be idle most of the time.

Therefore, the percentage of time the busiest radio telephone operator is utilized within each DTOC configuration seems to be a better measure of effectiveness than just taking the average. Also, this measure better accomplishes the objective of determining DTOC configuration effects on the radio telephone operators because it looks at the worst case.

Conclusion on Measures of Effectiveness. Based on the foregoing discussion the measures of effectiveness chosen for this analysis are:

1. Average message processing time.
2. Maximum operator utilization (percentage).

CHAPTER III

The Model

System and Model Definition

A system can be defined as "...a group of objects that are joined together in some regular interaction or interdependence toward the accomplishment of some purpose" (2:6). In this study the system is the division tactical operations center (DTOC) communications equipment, communications channels and radio telephone operators interacting to provide the division commander and his staff with information, in the form of received messages, upon which to make decisions regarding the issuance of tactical orders.

Models can be defined as "...descriptions of systems" (19:2). As Pritsker (19:3-4) explains it, a model does not need to include every detail which affects the system. However, models include sufficient detail so that accurate conclusions can be made.

Model

Introduction. A single model with two modifications was developed for this study.

The basic model describes the present consolidated DTOC configuration. In this model, the six functional groups of the DTOC are co-located. The division message center is located 500 to 2000 meters from the DTOC. Each functional

group of the DTOC has access to all information received by any other functional group. This sharing of information enables each group to efficiently perform their missions.

The first modification describes the dispersed division tactical operations center (DTOC) configuration (Dispersed 1). This is a proposed DTOC configuration which utilizes existing communications equipment. In this model the six functional groups of the DTOC are dispersed, 500 to 2000 meters apart. They no longer have immediate access to each other's received information. Therefore, the internal DTOC radio net is utilized to share this mission essential information.

The second modification describes the dispersed division tactical operations center (DTOC) configuration (Dispersed 2). The difference between this configuration and the present dispersed DTOC configuration is the communications equipment. This model reflects the Army's procurement of the mobile subscriber equipment (MSE) communications system which will be in the inventory in 1993 (17;21:47-48). This equipment interfaces with both wire and radio communications systems and enables a user to communicate with any other user in the system regardless of his or her means of communication. The system is secure and its intelligent software provides the sender with the capability to send a message to several receivers simultaneously (15).

The model is coded in Simulation Language for Alternative Modeling (SLAM) (19:ix). The computer code for the basic model and two modifications is located in Appendices B,C, and D, respectively. The FORTRAN subroutines which interface with the SLAM computer code is located in Appendix E. A description of the operation of these three models will be presented in the following sections.

Common. In order to compare the three division tactical operations center (DTOC) configurations and make observations pertaining to their relative effectiveness (in terms of information processing and operator workload) the model is required to simulate the processing of 281 messages per day for 30 days. The messages received by the DTOC can be categorized as either situation dependent or situation independent.

Situation dependent reports are randomly sent to the DTOC. These reports are based upon enemy contact or unforseen developments that may affect the accomplishment of the division's tactical mission. As such, they are primarily transmitted to the DTOC via FM radio on the division command net. These reports were not modeled for the following reasons:

1. If the dispersed systems can not handle the situation independent, day-to-day, reports they definitely will not be able to handle these.

2. Data for these reports is dependent on the selected scenario. Therefore, the results of the study, if these reports are included, could not be applied to all situations.

The messages modeled in this study are situation independent reports. These reports are required and periodic. They are sent to the DTOC regardless of the current tactical situation. These reports are listed in Appendix F. There are two means by which these reports are normally sent to the DTOC. One is directly by FM radio on the division intelligence/operations net. The second is via the division message center by the use of radio teletype, teletype, or multi-channel communications equipment. These messages are then delivered to the DTOC by jeep. These messages are ideal for conducting this study for the following reasons:

1. These reports provide most of the information used by the division staff in their planning of day-to-day activities and future operations.
2. Each report is required to be sent a designated number of times per day.
3. The number of units/activities sending each is designated.

This data is tabularized in Appendix F. The method by which message processing time was established for each report is shown in Appendix G.

Consolidated DTOC Configuration. This is the standard division tactical operations center (DTOC) configuration in present use by the United States Army. This system is portrayed in Figure 3. The model simulates messages being sent to the DTOC either directly using the intelligence/operations (I/O) radio net to the radio telephone operators or indirectly via the division message center. Only one message can be processed at a time on the I/O radio net. Messages received by the division message center are sent hourly, by jeep, to the DTOC where the information is immediately available to all the functional groups (10; 11).

KEY

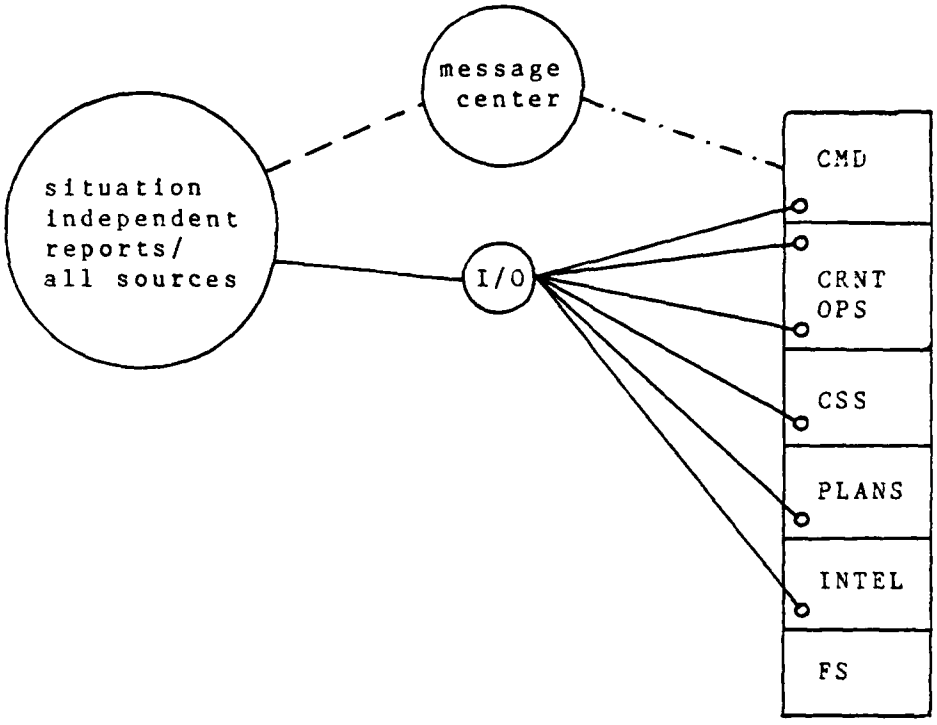
Division Functional Groups

CMD - command cell
CRNT OPS - G2/G3 current operations cell
CSS - G1/G4 combat service support cell
PLANS - G2/G3 planning cell
INTEL - intelligence cell
FS - fire support cell

Communications Channels

teletype, radio teletype, multichannel - _ _ _ _ _ _
courrier/jeep - _ . _ . _ .
intelligence/operations (I/O) radio net - _____

radio telephone operators - o



Note: The fire support cell does not have a radio for the intelligence/operations net. The current operations cell has two radio telphone operators, one for the G3 and one for the G2

Figure 3 - Present Configuration and Organization

Dispersed 1. This is a proposed division tactical operations center (DTOC) configuration. This system relies on communications hardware presently available to the United States Army. This system is portrayed in Figure 4. This is a modification of the basic model which includes an internal DTOC radio net. This internal net enables the DTOC functional groups to share mission essential information. The radio telephone operators have two nets to operate: the division intelligence/operations (I/O) net and the DTOC internal net. This internal radio net can process only one message at a time. Additionally, the jeep, which carries messages from the division message center to the DTOC, delivers messages addressed to the G2 and G3 to the current operations cell and messages addressed to the G1 and G4 to the combat service support cell. This requires two deliveries since these cells are at separate locations in the dispersed configuration.

This model is considerably more complicated than the consolidated DTOC configuration model because it includes several decision rules. These decision rules insure that all functional groups requiring access to information contained within any message receive this information either by monitoring the I/O radio net or by receiving the retransmitted message on the internal DTOC radio net.

KEY

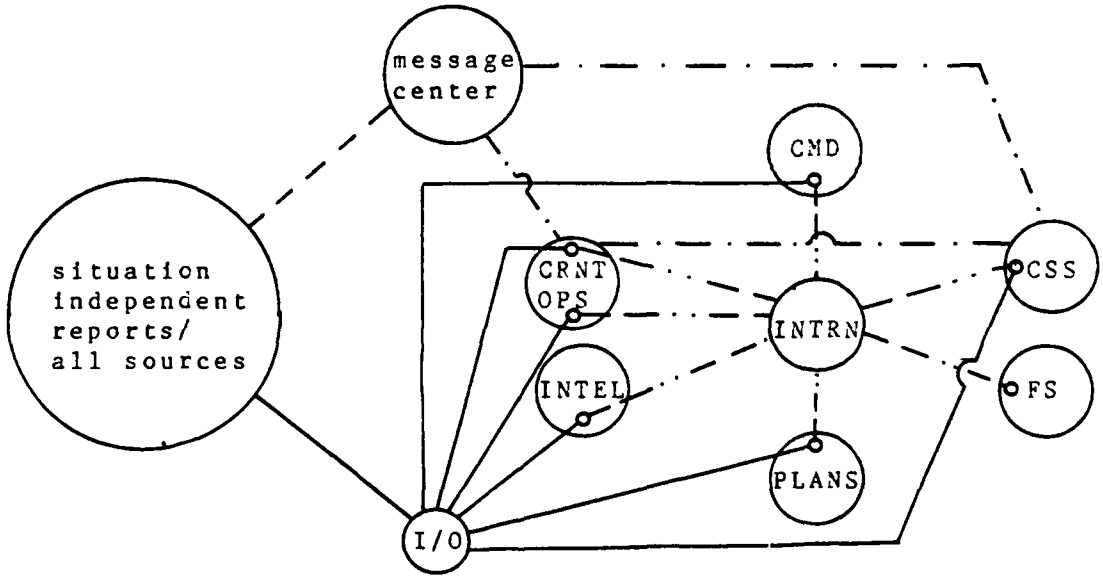
Division Functional Groups

CMD - command cell
CRNT OPS - G2/G3 current operations cell
CSS - G1/G4 combat service support cell
PLANS - G2/G3 planning cell
INTEL - intelligence cell
FS - fire support cell

Communications Channels

internal DTOC (INTRN) radio net - _ _ . . _ _
teletype,radio teletype,multichannel - _ _ _ _ _ _
courrier/jeep - _ . _ . _ .
intelligence/operations (I/O) radio net - _____

radio telephone operators - o



Note: The fire support cell does not have a radio for the intelligence/operations net. The current operations cell has two radio telphone operators, one for the G3 and one for the G2

Figure 4 - Dispersed 1 Configuration and Organization

Dispersed 2. This is a proposed division tactical operations center configuration using the mobile subscriber equipment being procured by the United States Army. This system reflects the capability of the MSE to automatically relay messages received at the division message center to the functional groups of the DTOC. These relayed messages are printed on line printers attached to each radio on the internal DTOC net. Therefore, using the same decision rules mentioned in the previous model, all functional groups requiring a particular message will simultaneously receive a copy. However, even though the MSE eliminates the use of the jeep for carrying messages from the division message center to the DTOC it must be noted that the internal DTOC net has the same (i.e. one report at a time) capacity as the intelligence/operations net. This may result in a queueing of the reports at the division message center. This system is portrayed in Figure 5.

Comments. The model does not consider nuclear-biological-chemical (NBC) operations, the effects of weather, or equipment reliability. An NBC environment generates its own special set of problems, such as electro-magnetic pulse, which are not addressed in the study. The effects of weather and equipment reliability were not included in the models in order to keep the analysis as simple and generic as possible, but enough detail was maintained to satisfy the study objectives.

KEY

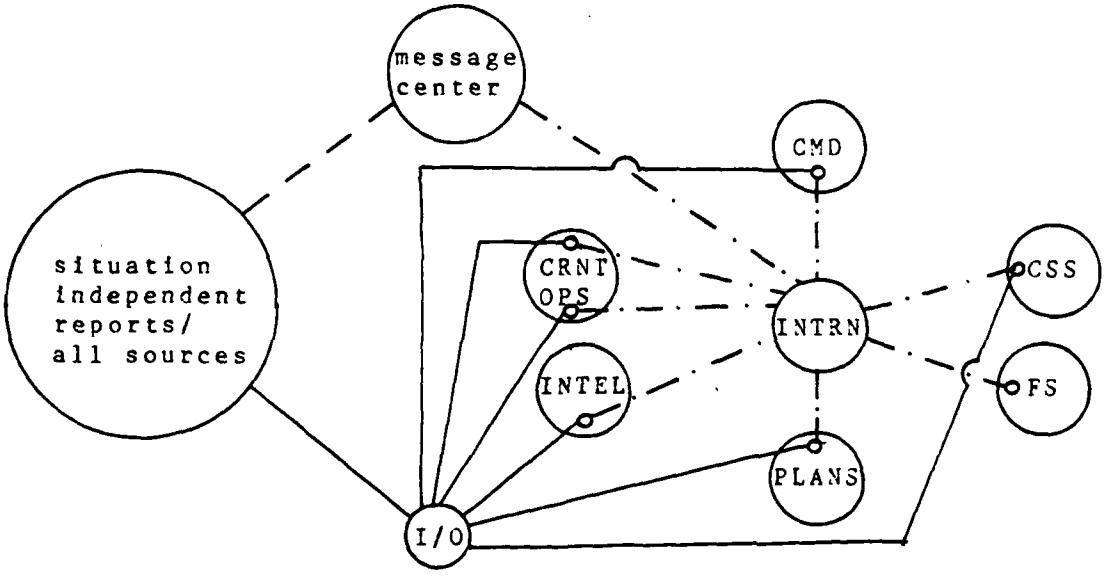
Division Functional Groups

CMD - command cell
CRNT OPS - G2/G3 current operations cell
CSS - G1/G4 combat service support cell
PLANS - G2/G3 planning cell
INTEL - intelligence cell
FS - fire support cell

Communications Channels

internal DTOC (INTRN) radio net - _ . _ . _ .
teletype, radio teletype, multichannel - _ _ _ _ _ _
intelligence/operations (I/O) radio net - _____

radio telephone operators - o



Note: The fire support cell does not have a radio for the intelligence/operations net. The current operations cell has two radio telphone operators, one for the G3 and one for the G2

Figure 5 - Dispersed 2 Configuration and Organization

Verification

The purpose of model verification is to assure that the conceptual model is accurately reflected in the computer code (19:379). In other words, does the computer model do what it is supposed to do?

SLAM provides for the use of monitor (MNTR) and numbered activity (ACT) statements which enables the user to systematically check the operation of the model. By using these tools and building the models one step at a time errors in the computer code were identified and corrected. For example, the basic model (consolidated DTOC) was coded first. By using numbered activity statements at each node, the quantity of messages flowing through each node was checked against hand calculations of the expected flow. Additionally, the monitor statement, with the trace option, was used to insure that each report arrived at the correct node for processing with the appropriate attribute values. Once the basic model was verified, the modifications for the dispersed configurations were added and the process was repeated.

Validation

Validation is the process of comparing the model and its behavior to the real system (19:383). Many of the parameters in the model are based on conversations with Major Garcia from the Electrical Engineering Department at the Air Force Institute of

Technology. He was an invaluable asset as an advisor on DTOC operations because of his first-hand professional experience in this area (10; 11; 12). In January 1986 the model and results were presented, in person, to Major Garcia and it was found that they accurately reflected his experience in DTOC operations.

CHAPTER IV

Design of Experiments

Introduction

The two basic considerations in the design of experiments are statistical accuracy and cost. Statistical accuracy involves selecting measures of effectiveness, identifying and choosing the factors to be studied in the experiment, determining the number of replications for the experiment, and determining the form of the analysis to be conducted. Cost involves selecting the simplest design of experiments and using the smallest sample size consistent with satisfactory results (19:461).

Measures of Effectiveness

Measures of effectiveness are also known as dependent or response variables. The measures of effectiveness for this experiment are:

1. Average message processing time.
2. Maximum operator utilization.

The rationale for the selection of these measures of effectiveness is provided in Chapter II.

Factors

Factors are commonly referred to as independent variables. After examining the model of the division tactical operations center's (DTOC) communications system several potential factors having a major influence on the

measures of effectiveness were identified:

Factor 1. DTOC configuration.

Factor 2. Distances between the functional groups of the DTOC and the division message center.

Factor 3. Number of generated messages.

Factor 4. Message length.

Factor 5. Message transmission time.

Factor 1. DTOC configuration is a factor of interest in this study and it is set at three levels. Each level corresponds to one of the DTOC configurations: consolidated, dispersed using existing communications hardware, or dispersed using future communications hardware.

Factor 2. The distances between the functional groups of the DTOC and the division message center is also a factor of interest because the message transportation time for the jeep, delivering messages from the message center to the DTOC, will vary with the distance involved. In the study, distance is set at a high and a low value. The low level represents a distance of 500 meters and the high level represents a distance of 2000 meters. These figures are based upon existing doctrine and professional experience (7:165;26).

Factor 3. The number of messages is held constant in order to compare the factors of interest. Therefore, it is not a factor in this study.

Factors 4 and 5. Each message is assigned a random transmission time, taken from a triangular distribution, based upon its length. Therefore, these are not factors in this study. Instead, they constitute the input data. Identification of the distribution and determination of the transmission time is shown in Appendix F.

Form of the Analysis

Since DTOC configuration and distance between the functional groups of the DTOC and the message center are the factors of interest in this study, a two-factor factorial design is used to analyze their effects at each specified level. The advantages of a factorial design are:

1. It is more efficient than a one-factor-at-a-time experiment.
2. It accounts for possible interactions between factors.
3. It enables the analyst to evaluate one factor's effects at several levels of other factors (18:192).

The data arrangement for the two-factor factorial design is shown in Table 1. This design can be expressed by the linear statistical model

$$Yijk = M + Ti + Bj + TBij + Eijk$$
$$(i = 1,2;\ j = 1,2,3;\ k = 1,2)$$

where

Yijk is the observation.

M is the overall mean effect.

Ti is the effect of the ith level of row factor A.
Bj is the effect of the jth level of the column factor B.

TBij is the interaction effect.

Eijk is the random error (18:193).

Table 1

Data Arrangement for the Two-Factor Factorial Design

		Factor B (DTOC Configuration)		
		Level 1 (Consolidated)	Level 2 (Dispersed 1)	Level 3 (Dispersed 2)
Factor A (Distance)	Level 1 (500 m)	Y111,Y112	Y121,Y122	Y131,Y132
	Level 2 (2000 m)	Y211,Y212	Y221,Y222	Y231,Y232

Key

Y - independent variable response to corresponding levels of the factors.

Number of Replications or Observations

The number of replications, n, of this experiment is 2. This results in a total of 12 replications, computer runs.

To determine the number of replications 5 pilot tests of

the experiment were conducted. This yielded standard deviations of 0.0408 minutes for average message processing time and 0.02 percent for maximum operator utilization. To obtain a 95 percent confidence that the error in estimating the average processing time is less than 5 seconds or 0.083 minutes and the error in estimating the critical operator utilization is 5 percent, the required number of replications is calculated as follows:

(general formula)

$$n = \left(\frac{Z_{\alpha/2}\sigma}{E}\right)^2$$

(for average message processing time)

n = [(1.96 x 0.0408)/0.083]^2 = 0.928

(for maximum operator utilization)

n = [(1.96 x 0.02)/0.05]^2 = 0.614

These calculations indicate that only one replication is required, however, at least two replications are desired so averages can be used in estimating the effects of the factors (18:192).

CHAPTER V

Results and Analysis

Results

The results of two replications of the treatment combinations are shown in Tables 2 and 3. In Table 2 the response variable is average message processing time, expressed in minutes. In Table 3 the response variable is maximum operator utilization, expressed as a percentage.

Table 2

Results for Average Message Processing Time

		Factor B (DTOC Configuration)		
		Level 1 (Consolidated)	Level 2 (Dispersed 1)	Level 3 (Dispersed 2)
Factor A (Distance)	Level 1 (500 m)	14.09 14.10	60.89 60.95	22.85 22.87
	Level 2 (2000 m)	16.15 16.16	61.47 61.52	22.85 22.87

Table 3

Results for Critical Operator Utilization

		Factor B (DTOC Configuration)		
		Level 1 (Consolidated)	Level 2 (Dispersed 1)	Level 3 (Dispersed 2)
Factor A (Distance)	Level 1 (500 m)	9.12 9.13	30.84 30.85	20.50 20.52
	Level 2 (2000 m)	9.12 9.13	30.84 30.86	20.50 20.52

Analysis

Since there are several population means that must be tested for equality in these experiments, analysis of variance (ANOVA) is the appropriate procedure for determining if the factors and their interaction are significant (23:324).

Average Message Processing Time. The analysis of variance is shown in Table 4. DTOC configuration, distance, and interaction are significant at the 0.05 level. However, since interaction is present a comparison of the means of one factor may be obscurred. Therefore, Duncan's multiple range test was applied by fixing the factors at each level, one at a time, and comparing all combinations of cell means. The results indicate, with one exception, that all cell means are significant at the 0.05 level. In general, when the DTOC

is dispersed average message processing time increases. However, the increase in average message processing time for the dispersed DTOC using future communications hardware (Dispersed 2) is not nearly as great as it is for the dispersed DTOC using present communications hardware (Dispersed 1). Additionally, as distance increases so does average message processing time; except in the Dispersed 2 configuration. The reason being, in the Dispersed 2 configuration messages are now sent to the DTOC via electromagnetic propagation, instead of by jeep. Figure 6 shows a graph of the average responses for each factor. The lack of parallelism of the lines indicates significant interaction between the two factors. Equations and calculations are shown in Appendix I.

Table 4

ANOVA for Average Message Processing Time

Source of Variation	Sum of Squares	Degrees of Freedom	Mean Square	Fo
Distance	2.3	1	2.3	115.0
Configuration	4871.9	2	2435.9	121795.0
Interaction	2.2	2	1.1	55.0
Error	0.1	6	0.02	
Total	4876.5	11		

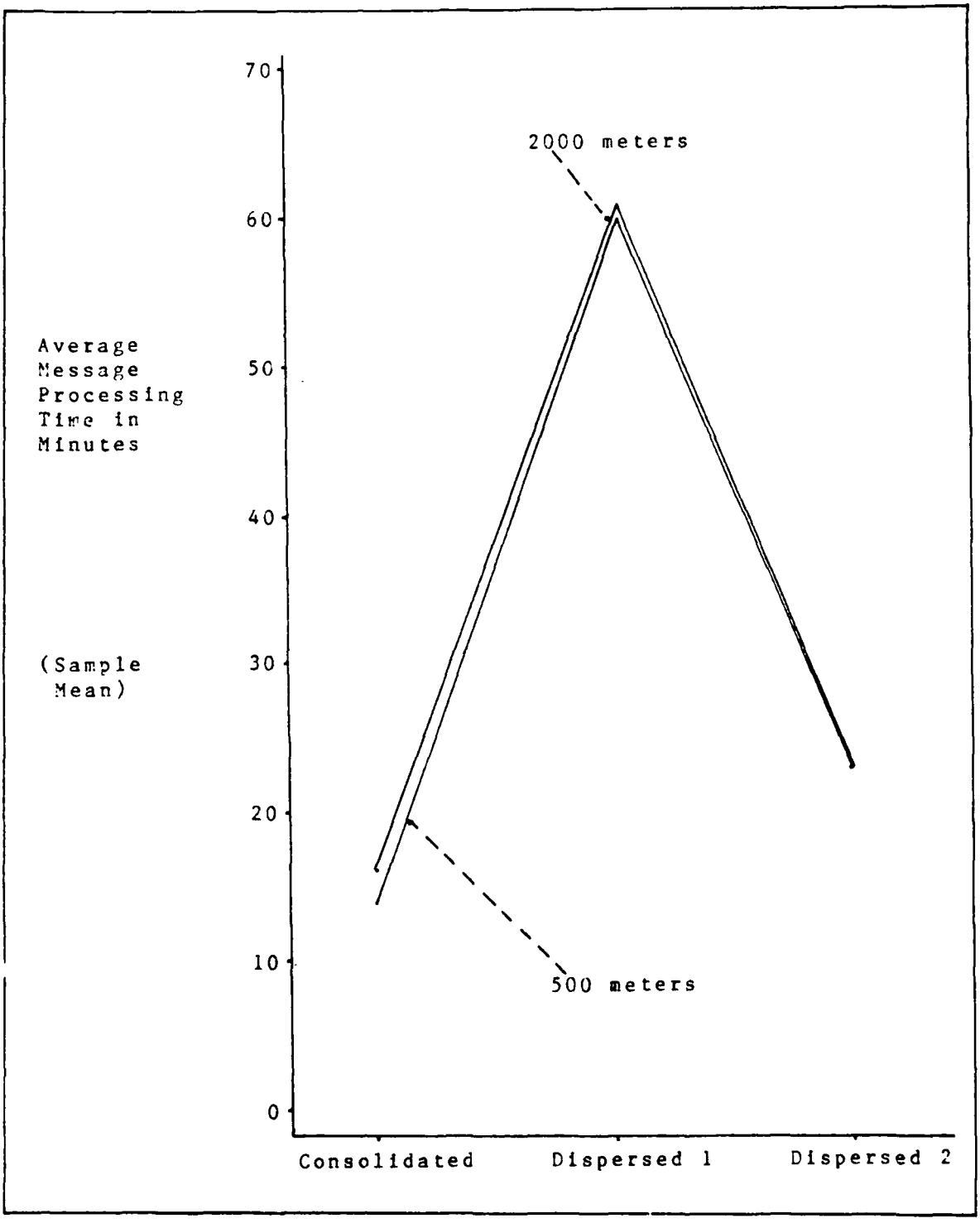


Figure 6 - DTOC Configuration/Distance Plot for Mean Response

Critical Operator Utilization. The analysis of variance for this response variable is shown in Table 5. The conclusion is that DTOC configuration is the only significant factor, at the 0.05 level, affecting operator utilization. In general, dispersing the DTOC increases operator utilization. However, the increase in operator utilization for the dispersed DTOC using future communications hardware is not nearly as great as it is for the dispersed DTOC using existing communications hardware. Figure 7 shows a graph of the average response for each factor. The fact that the lines for the distance factor are nearly identical indicates very little interaction or significance. Equations and calculations are shown in Appendix I.

Table 5

ANOVA for Critical Operator Utilization

Source of Variation	Sum of Squares	Degrees of Freedom	Mean Square	Fo
Distance	0.00001	1	0.00001	0.07
Configuration	908.7	2	454.4	3634698.0
Interaction	0.00002	2	0.00001	0.07
Error	0.00075	6	0.00013	
Total	908.70078	11		

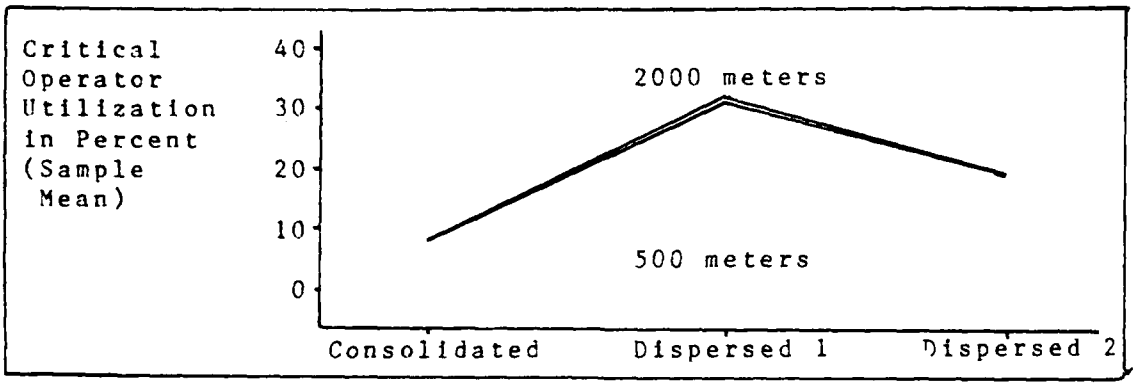


Figure 7 - DTOC Configuration/Distance Plot for Mean Response

Sensitivity Analysis

One of the sub-objectives of this study is to determine when critical radio telephone operator(s) saturation occurs. In other words, how many messages must be generated before the busiest radio telephone operator reaches 100 percent utilization? The reason this is a concern is that the model only simulates situation independent reports flowing through the DTOC, and even though this represents the majority of message traffic in the intelligence/operations radio net, it does not represent the total workload.

To accomplish this the number of messages is increased incrementally from the base case of 281 messages/day by an additional 281 messages/day until system failure occurs in each DTOC configuration. In every configuration the busiest radio telephone operator (RTO) is the G3 current operations RTO. Figure 8 shows a graphical portrayal of this analysis. The graph indicates, for each DTOC configuration, that operator utilization increases linearly with the number of messages. In other words, if the number of messages doubles

so does operator utilization. Therefore, operator utilization is sensitive to the number of messages.

This sensitivity analysis also suggests two other interesting facts about the DTOC configurations under investigation. First, the intelligence/operations radio net becomes saturated, causing system failure, before operator utilization reaches 100 percent. The point of system failure for each configuration is shown in Figure 8. Second, the consolidated DTOC configuration has the capability to handle considerably more messages than either of the dispersed DTOC configurations even though the number of messages generated at system failure for any configuration is unlikely to occur.

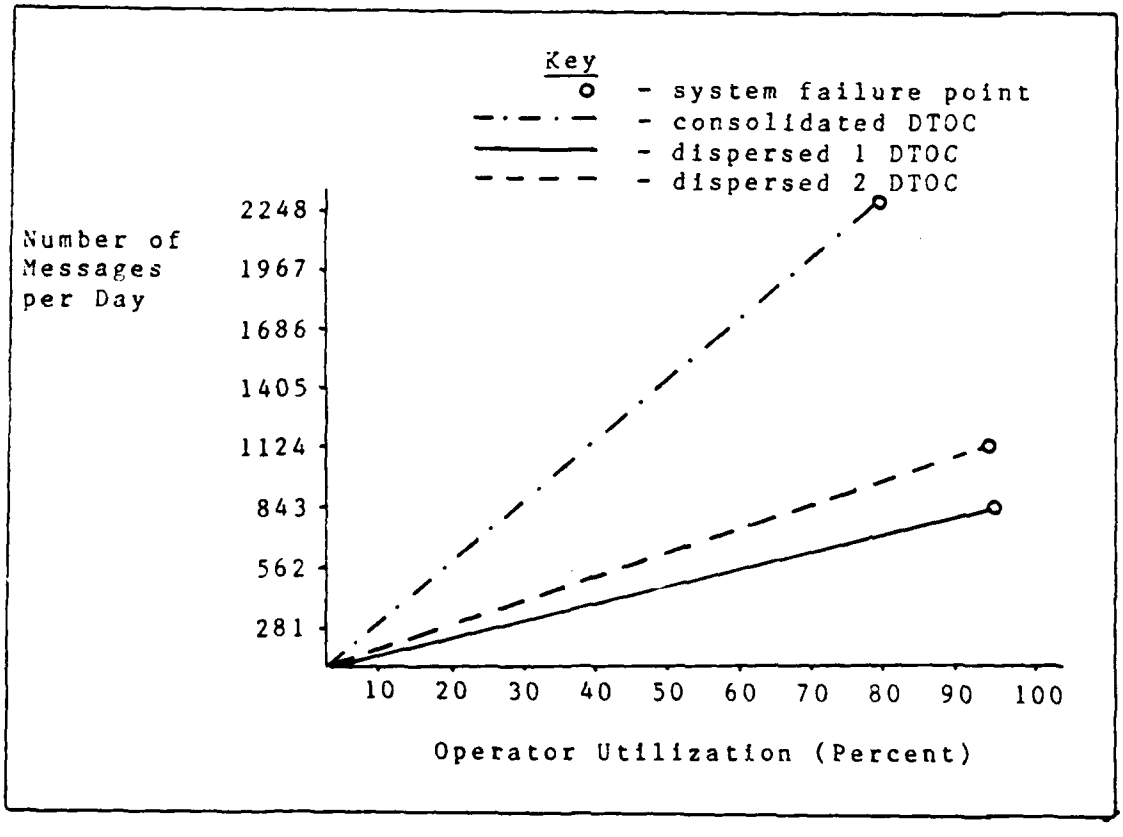


Figure 8 - Sensitivity Analysis

Excursions

There are two excursions considered in this study. The first excursion looks at using two radio telephone operators (RTO's) per cell instead of one as a means to decrease average message processing time in the dispersed 1 DTOC configuration. The second excursion looks at providing the fire support cell with an additional radio in the dispersed 2 DTOC configuration so it too can monitor the intelligence/operations radio net.

Excursion 1. Since it may be necessary to disperse the DTOC in order to increase its survivability and this study has indicated that such a move will adversely affect the efficiency of information processing, the question becomes, what can be done to reduce this inefficiency? One solution may be to assign an additional RTO to each cell. This may require assigning twelve additional RTO's to the DTOC. However, this would only be a short term solution until the Army purchases the MSE. In doing so, one RTO is dedicated solely to the intelligence/operations radio net and the other RTO is dedicated solely to the internal DTOC radio net. The results of this investigation are shown by bar graphs in Figure 9. This illustrates that by adding one RTO per cell in the dispersed 1 DTOC configuration average message processing time can be reduced by almost one-half. However, it is still nearly double that of the

consolidated DTOC configuration and is significant at the 0.05 level. This is shown in Appendix I.

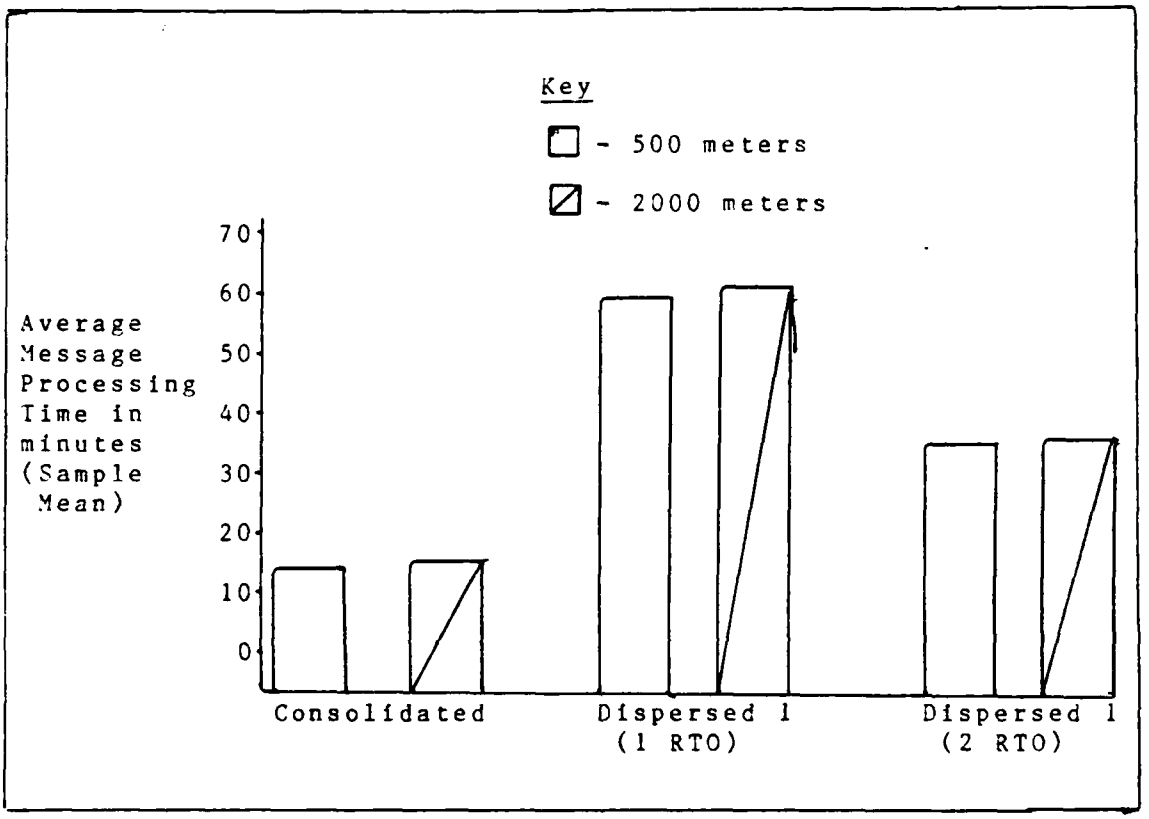


Figure 9 - DTOC Configuration/Distance Bar Graph

Excursion 2. In the dispersed 2 DTOC configuration, with the exception of the fire support element, the sole function of the internal DTOC radio net is to print reports relayed via the division message center. Therefore, since the fire support element can not monitor the intelligence/operations radio net the other cells must retransmit certain mission essential information on the internal DTOC radio net to it. However, by providing the fire support element with an additional radio so this RTO can

monitor the intelligence/operations radio net, this retransmission of messages by the RTO's will no longer be necessary. The null hypothesis that the sample mean average message processing time for the consolidated DTOC configuration is greater than the sample mean average message processing time for the dispersed 2 DTOC configuration was accepted at the 0.05 level. This is shown in Appendix I.

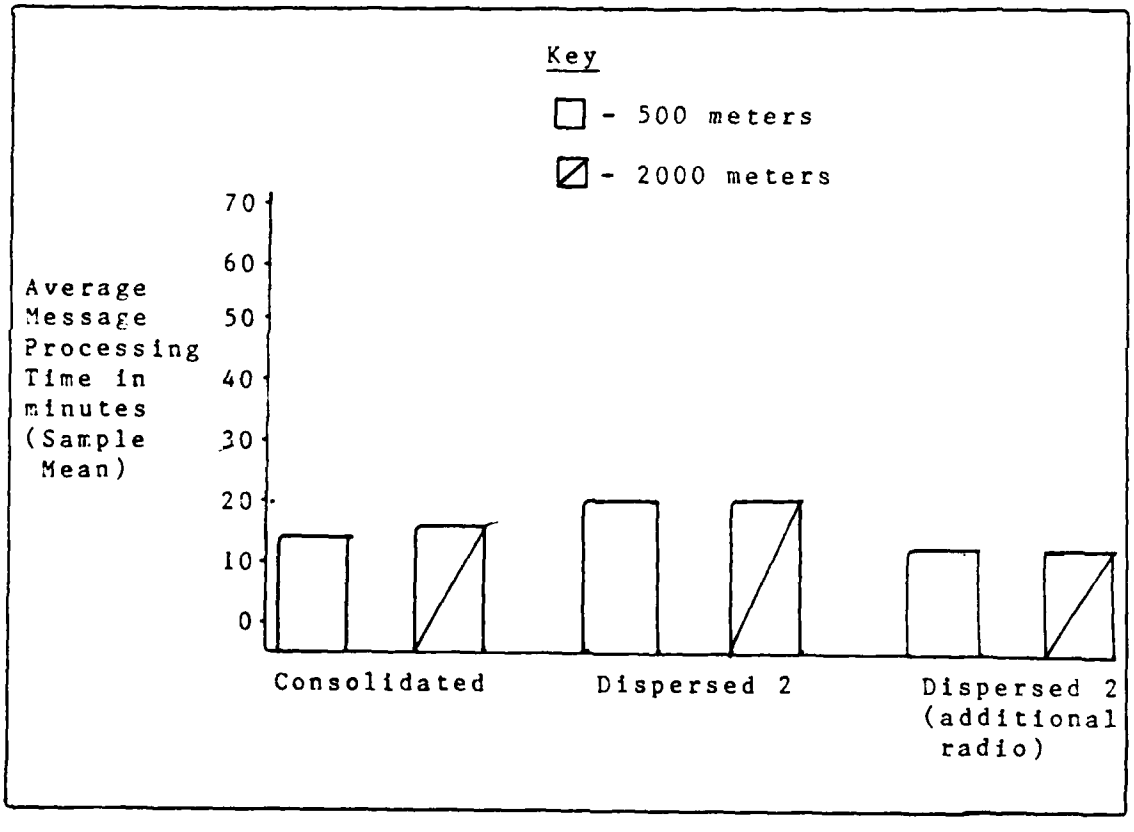


Figure 10 - DTOC Configuration/Distance Bar Graph

CHAPTER VI

Observations and Recommendations

Observations

Objective. The principle objective of this research is to provide the Command Control Analysis Division with a statistical analysis of the effects DTOC configuration has on radio telephone operators (RTO's) and message processing time. This study shows that dispersing the DTOC significantly increases the utilization of the RTO's. This increase should not affect DTOC operations unless the workload, as modeled, is not significantly less than that in the actual system. However, this result does indicate that RTO's may have to be better qualified because of the increased workload.

This study also shows that average message processing time increases when the DTOC is dispersed. In fact, dispersing the DTOC using present communications hardware may not be feasible because this configuration increases average message processing time by a factor of four. Even if an additional RTO is assigned to each cell, as shown in Chapter V, average message processing time is more than doubled. These increases in processing time could severely restrict the ability of the division staff to perform their missions. Additionally, this study shows that when the MSE becomes available the DTOC should be dispersed because this

configuration only results in a slight increase in message processing time and is inherently more survivable on the modern battlefield. In fact, the only reason message processing time is not better than it is in the consolidated DTOC is because of the lack of one FM radio in the fire support cell which would enable this cell to monitor the intelligence/operations radio net. Therefore, the additional radio should be provided, especially since its cost when compared to the purchase of the MSE is insignificant.

Sub-objectives.

The first sub-objective is to identify the critical radio telephone operator(s) within the DTOC. This study shows this to be G3 current operations RTO (Appendix H). This was expected since this cell is the focal point of the DTOC. However, it does reinforce the point that the most qualified RTO should be assigned to this node.

The second sub-objective is to determine when critical radio telephone operator saturation occurs. This study does not show when critical RTO saturation occurs since it was discovered that the intelligence/operations radio channel reaches maximum capacity, causing system failure, prior to this RTO becoming saturated.

Recommendations

This study is restricted to situation independent reports which are sent to the DTOC directly via the intelligence/operations radio net or indirectly through the

division message center. Further studies which include situation dependent reports which are sent primarily to the DTOC via the command net would be beneficial. Additionally, equipment reliability, weather effects, and various tactical scenarios including the effects of EMP could be incorporated into the model in order to study their effects.

APPENDIX A

DTOC Personnel and Organization
(Example is for an armor or mechanized infantry division TOE)

Command Cell

* - On Call
A - On Duty from 1200 - 2400 hours
B - On Duty from 2400 - 1200 hours

Title	Shift	Grade	Number
CG	*	08	1
AIDE	*	03	1
CSM	*	E9	1
CH OF STAFF	*	06	1
SGS	*	04	1
EXEC ADMIN ASST	*	E6	1
EXEC ADMIN ASST	*	E5	1
VEHICLE DRIVER	*	E4	1
CHAUFFEUR	*	E6	1
LNO	*	03	3
LNO SGT	*	E6	3

Current Operations Cell

Title	Shift	Grade	Number
G3	*	05	1
G2	*	05	1
ASST G3	B	04	1
G3 AIR	A	04	1
OPERATIONS OFF	A/B	04	2
TAC SURVL OFF	A	03	1
ASST G3 AIR	B	03	1
ASST G3 AIR	A	03	1
CH OPNS SGT	A	E9	1
ASST OPNS SGT	B	E8	1
INTEL SR SGT	A	E8	1
AERIAL INTEL ANAL	A	E8	1
SR GSR SGT	B	E8	1
CI OPNS SGT	B	E8	1
G3 AIR SGT	A	E7	1
OPNS SGT	A	E7	1
ASST G3 AIR SGT	B	E6	1
INTEL ANAL	A	E5	1
EXEC ADMIN ASST	A	E5	1
CLERK	B	E3	1
OPNS ASST	A/B	E3	2

Current Operations Cell (cont'd)

Title	Shift	Grade	Number
ASST DIV C-E OFF	A	04	1
C-E OPNS CH	B	E8	1
ASST DIV ENGR	A	04	1
CBT CONST FOREMAN	B	E8	1
TECH DRAFT SPEC	A	E4	1
CBT CONST SPEC	B	E4	1
DIV CHEM OFF	A	05	1
NBC OFF	A/B	03	2
NBC OPER/STF NCO	A	E9	1
NBC OPER/STF NCO	A/B	E8	2
NBC OPER/STF NCO	A/B	E7	2
CLERK/TYPIST	A/B	E4	2
BDLT CHIEF	A	03	1
ASST BDLT CHIEF	B	02	1
BDLT NCOIC	A	E6	1
ASST BDLT NCOIC	B	E5	1
DIV PM	A	05	1
ASST OPNS SGT	B	E7	1

Intel Cell

Title	Shift	Grade	Number
SSO	A	03	1
SSO SPEC	B	E5	1
OPERATIONS CHIEF	A	03	1
TRAFFIC ANAL SPEC	B	E8	1
TAC SUR OFF	B	03	1
TRAF ANAL TECH	A	WO	1
AERIAL INTEL ANAL	B	E7	1
GND SURVL SYS SGT	A	E6	1
INTEL ANAL	A/B	E5	1
EW/CRYPTO SEC	A	03	1
TAC INTEL OFF	A	03	1
OB TECHNICIAN	B	WO	1
TRAF ANAL TECH	A	WO	1
INTELLIGENCE SGT	B	E7	1
SR INTEL ANAL	A	E6	1
EW/SIGINT ANAL	A/B	E5	2
EW/SIGINT ANAL	A	E4	1
INTEL ANAL	A	E4	1
INTEL ANAL	B	E3	1
EW/CRYPTO OFF	A	03	1
EW/MSN NCO	B	E7	1
CI OFFICER	A	03	1
OPERATIONS SGT	B	E7	1
CI AGENT	A	E6	1
RDO TM CHIEF	A	E5	1
RDO TTY OP	B	E4	1
RDO TTY OP	A	E3	1

Plans Cell

Title	Shift	Grade	Number
PLANS OFF	A	04	1
ASST G2	A	04	1
ASST PLANS OFF	A/B	03	2
ASST G3 AIR	A	03	1
OP SGT	A	E8	1
ASST OPNS SGT	B	E7	1
ASST G3 AIR SGT	B	E6	1
EXEC ADMIN ASST	A	E4	1
CLERK/TYPIST	B	E4	1
OPNS ASST	A	E3	1
DECP CELL OIC	A	03	1
DECP CELL NCOIC	B	E7	1
CI ANAL	A	E6	1
EW/SIGINT ANAL	B	E5	1
INTEL ANA'	A	E5	1
AD OPMS [illegible]	A	04	1
OPNS ASST	B	E4	1
ASST CHE[illegible] OFF	A	04	1
NBC STAFF NCO	B	E7	1

Fire Support Cell

Title	Shift	Grade	Number
DIV ARTY OFF	*	06	1
ASST FS COORD	A	05	1
ASST FS COORD	B	04	1
FA INTEL OFF	A	04	1
FA INTEL OFF	B	03	1
TARGET ANALYST	A/B	03	2
FIRE SPT SGT	A	E7	1
ASST FIRE SPT SGT	B	E6	1
OPNS SP	A/B	E4	2
RATT OP	A	E4	1
OPNS SGT	A	E7	1
OPNS ASST	B	E4	1
ASST DIV AVN AFF	A	03	1
OPS OFF	B	02	1
FLT OPNS SGT	A	E6	1
FLT OPNS SPEC	B	E4	1
TACTICAL ALO	A	05	1
TAC ALO RECCE	A	04	1
ROMAD	B	E7/E5	2
AIR OPNS SPEC	A	E6	1
GRND RDO COMM RPM	A	E6	1
SUPPLY SPEC	A	E4	1
ADMIN SPEC	A	E5	1

Combat Service Support Cell

Title	Shift	Grade	Number
G1	A	05	1
PERS SGT	B	E9	1
CLERK TYPIST	A	E4	1
G4	A	05	1
ASST CA DTO	A	04	1
ASST CA SUP SVCS	A	04	1
CH SUP SGT	B	E9	1
TRANS SGT	B	E8	1
CLERK/TYPIST	A	E4	1
G5	A	05	1
SECRETARY	B	E5	1
HQ COMDT	A	04	1
OPNS SGT	B	E7	1
ASST OP SGT	A	E6	1
TACTICAL ALO	A	04	1
ROMAD	B	E4	1
GRD RDO COMM RPMN	A	E5	1
ADMIN SPEC	A	E4	1

APPENDIX B

Base Case Model/Consolidated DTOC

```
GEN,MENGLERT,THESIS,10/28/85,1,NO,YES,YES,YES,YES/1,132;
LIMITS,26,10,10000;
NETWORK;
;
;  TIME IS MINUTES
;
        RESOURCE/NET(1),1;                                  O/I FM SEC NET
        RESOURCE/INT(1),13,14,15,16,17,18,24,25;    INTERNAL TOC NET
        RESOURCE/CP1(1),3,9,19,13,14,15,16,17,18;   CMD CELL RTO
        RESOURCE/OP2(1),4,10,13,14,15,16,17,18,25; CRNT OPS RTO
        RESOURCE/OP3(1),20,24;                      CRNT OPS RTO
        RESOURCE/OP4(1),6,11,21,13,15,18;           CSS      RTO
        RESOURCE/OP5(1),7,12,22,13,14,15,16,17,18; PLANS     RTO
        RESOURCE/OP6(1),8,23,13,16,17;              INTEL    RTO
        RESOURCE/OP7(1),13,14,16,18,24,25;          FSE      RTO
;
        GATE/JEEP,CLOSE,2;
        GATE/JEPE,CLOSE,26;
        CREATE,60,,1,,1;
          ACT/20,XX(5);
        OPEN,JEEP;
          ACT/21,XX(5);
        OPEN,JEPE;
          ACT/22,10;
        CLOSE,JEEP;
        CLOSE,JEPE;
        TERM;
;
        CREATE,XX(2),,1,60,1;           INTEL SUM RPT (RATT)
        ASSIGN,ATRIB(2)=9,ATRIB(3)=TRIAG(1.77,1.88,2.00,1),ATRIB(4)=5,1;
          ACT,,,MSG;                DMAIN G2
;
        CREATE,XX(2),,1,60,1;           AD STAT RPT (FM SEC)
        ASSIGN,ATRIB(2)=24,ATRIB(3)=TRIAG(1.45,1.57,1.68,1),ATRIB(4)=8,1;
          ACT,,,OI;                 DMAIN G3
        CREATE,XX(2),,1,60,1;
        ASSIGN,ATRIB(2)=24,ATRIB(3)=TRIAG(1.45,1.57,1.68,1),ATRIB(4)=8,1;
          ACT,,,OI;
        CREATE,XX(2),,1,60,1;
        ASSIGN,ATRIB(2)=24,ATRIB(3)=TRIAG(1.45,1.57,1.68,1),ATRIB(4)=8,1;
          ACT,,,OI;
        CREATE,XX(2),,1,60,1;
        ASSIGN,ATRIB(2)=24,ATRIB(3)=TRIAG(1.45,1.57,1.68,1),ATRIB(4)=8,1;
          ACT,,,OI;
;
        CREATE,XX(3),,1,120,1;           CHEM DNWIND MSG (TTY)
        ASSIGN,ATRIB(2)=27,ATRIB(3)=TRIAG(1.27,1.37,1.47,1),ATRIB(4)=1,1;
          ACT,,,MSG;                DMAIN G3
```

```
;
        CREATE,XX(1),,1,30,1;           AVN STAT RPT (FM SEC)
        ASSIGN,ATRIB(2)=57,ATRIB(3)=TRIAG(0.93,1.03,1.13,1),ATRIB(4)=8,1;
          ACT,,,OI;                   DMAIN G3
;
        CREATE,XX(1),,1,30,1;           POW RPT (RATT)
        ASSIGN,ATRIB(2)=66,ATRIB(3)=TRIAG(1.10,1.20,1.30,1),ATRIB(4)=4,1;
          ACT,,,MGS;                  DMAIN G1
        CREATE,XX(1),,1,30,1;
        ASSIGN,ATRIB(2)=66,ATRIB(3)=TRIAG(1.10,1.20,1.30,1),ATRIB(4)=4,1;
          ACT,,,MGS;
        CREATE,XX(1),,1,30,1;
        ASSIGN,ATRIB(2)=66,ATRIB(3)=TRIAG(1.10,1.20,1.30,1),ATRIB(4)=4,1;
          ACT,,,MGS;
        CREATE,XX(1),,1,30,1;
        ASSIGN,ATRIB(2)=66,ATRIB(3)=TRIAG(1.10,1.20,1.30,1),ATRIB(4)=4,1;
          ACT,,,MGS;
        CREATE,XX(1),,1,30,1;
        ASSIGN,ATRIB(2)=66,ATRIB(3)=TRIAG(1.10,1.20,1.30,1),ATRIB(4)=4,1;
          ACT,,,MGS;
        CREATE,XX(1),,1,30,1;
        ASSIGN,ATRIB(2)=66,ATRIB(3)=TRIAG(1.10,1.20,1.30,1),ATRIB(4)=4,1;
          ACT,,,MGS;
        CREATE,XX(1),,1,30,1;
        ASSIGN,ATRIB(2)=66,ATRIB(3)=TRIAG(1.10,1.20,1.30,1),ATRIB(4)=4,1;
          ACT,,,MGS;
        CREATE,XX(1),,1,30,1;
        ASSIGN,ATRIB(2)=66,ATRIB(3)=TRIAG(1.10,1.20,1.30,1),ATRIB(4)=4,1;
          ACT,,,MGS;
        CREATE,XX(1),,1,30,1;
        ASSIGN,ATRIB(2)=66,ATRIB(3)=TRIAG(1.10,1.20,1.30,1),ATRIB(4)=4,1;
          ACT,,,MGS;
;
        CREATE,XX(1),,1,30,1;             EQUIP WRAPUP RPT (TTY)
        ASSIGN,ATRIB(2)=1047,ATRIB(3)=TRIAG(0.62,0.72,0.82,1),ATRIB(4)=2,1;
        ACT,,,MGS;                      DMAIN G4
        CREATE,XX(1),,1,30,1;             EQUIP WRAPUP RPT (TTY)
        ASSIGN,ATRIB(2)=1047,ATRIB(3)=TRIAG(0.62,0.72,0.82,1),ATRIB(4)=2,1;
        ACT,,,MGS;                      DMAIN G4
        CREATE,XX(1),,1,30,1;             EQUIP WRAPUP RPT (TTY)
        ASSIGN,ATRIB(2)=1047,ATRIB(3)=TRIAG(0.62,0.72,0.82,1),ATRIB(4)=2,1;
        ACT,,,MGS;                      DMAIN G4
        CREATE,XX(1),,1,30,1;             EQUIP WRAPUP RPT (TTY)
        ASSIGN,ATRIB(2)=1047,ATRIB(3)=TRIAG(0.62,0.72,0.82,1),ATRIB(4)=2,1;
        ACT,,,MGS;                      DMAIN G4
        CREATE,XX(1),,1,30,1;             EQUIP WRAPUP RPT (TTY)
        ASSIGN,ATRIB(2)=1047,ATRIB(3)=TRIAG(0.62,0.72,0.82,1),ATRIB(4)=2,1;
        ACT,,,MGS;                      DMAIN G4
        CREATE,XX(1),,1,30,1;             EQUIP WRAPUP RPT (TTY)
        ASSIGN,ATRIB(2)=1047,ATRIB(3)=TRIAG(0.62,0.72,0.82,1),ATRIB(4)=2,1;
        ACT,,,MGS;                      DMAIN G4
        CREATE,XX(1),,1,30,1;             EQUIP WRAPUP RPT (TTY)
        ASSIGN,ATRIB(2)=1047,ATRIB(3)=TRIAG(0.62,0.72,0.82,1),ATRIB(4)=2,1;
        ACT,,,MGS;                      DMAIN G4
        CREATE,XX(1),,1,30,1;             EQUIP WRAPUP RPT (TTY)
```

```
        ASSIGN,ATRIB(2)=1047,ATRIB(3)=TRIAG(0.62,0.72,0.82,1),ATRIB(4)=2,1;
        ACT,,,MGS;                    DMAIN G4
        CREATE,XX(1),,1,30,1;            EQUIP WRAPUP RPT (TTY)
        ASSIGN,ATRIB(2)=1047,ATRIB(3)=TRIAG(0.62,0.72,0.82,1),ATRIB(4)=2,1:
        ACT,,,MGS;                    DMAIN G4
;
        CREATE,XX(1),,1,30,1;            ENGR ASSES RPT (FM SEC)
        ASSIGN,ATRIB(2)=1041,ATRIB(3)=TRIAG(1.22,1.32,1.42,1),ATRIB(4)=2,1;
        ACT,,,OI;                     DMAIN G3
;
        CREATE,XX(1),,1,30,1;            DS MAINT RPT (TTY)
        ASSIGN,ATRIB(2)=1035,ATRIB(3)=TRIAG(1.23,1.33,1.43,1),ATRIB(4)=2,1;
        ACT,,,MGS;                    DMAIN G4
        CREATE,XX(1),,1,30,1;
        ASSIGN,ATRIB(2)=1035,ATRIB(3)=TRIAG(1.23,1.33,1.43,1),ATRIB(4)=2,1;
        ACT,,,MGS;                    DMAIN G4
        CREATE,XX(1),,1,30,1;
        ASSIGN,ATRIB(2)=1035,ATRIB(3)=TRIAG(1.23,1.33,1.43,1),ATRIB(4)=2,1;
        ACT,,,MGS;                    DMAIN G4
        CREATE,XX(1),,1,30,1;
        ASSIGN,ATRIB(2)=1035,ATRIB(3)=TRIAG(1.23,1.33,1.43,1),ATRIB(4)=2,1;
        ACT,,,MGS;                    DMAIN G4
;
        CREATE,XX(4),,1,180,1;             UNIT LOC RPT (FM SEC)
        ASSIGN,ATRIB(2)=126,ATRIB(3)=TRIAG(0.82,0.92,1.02,1),ATRIB(4)=8,1;
        ACT,,,OI;                     DMAIN G3
        CREATE,XX(4),,1,180,1;             UNIT LOC RPT (FM SEC)
        ASSIGN,ATRIB(2)=126,ATRIB(3)=TRIAG(0.82,0.92,1.02,1),ATRIB(4)=8,1;
        ACT,,,OI;                     DMAIN G3
        CREATE,XX(4),,1,180,1;             UNIT LOC RPT (FM SEC)
        ASSIGN,ATRIB(2)=126,ATRIB(3)=TRIAG(0.82,0.92,1.02,1),ATRIB(4)=8,1;
        ACT,,,OI;                     DMAIN G3
        CREATE,XX(4),,1,180,1;             UNIT LOC RPT (FM SEC)
        ASSIGN,ATRIB(2)=126,ATRIB(3)=TRIAG(0.82,0.92,1.02,1),ATRIB(4)=8,1;
        ACT,,,OI;                     DMAIN G3
        CREATE,XX(4),,1,180,1;             UNIT LOC RPT (FM SEC)
        ASSIGN,ATRIB(2)=126,ATRIB(3)=TRIAG(0.82,0.92,1.02,1),ATRIB(4)=8,1;
        ACT,,,OI;                     DMAIN G3
        CREATE,XX(4),,1,180,1;             UNIT LOC RPT (FM SEC)
        ASSIGN,ATRIB(2)=126,ATRIB(3)=TRIAG(0.82,0.92,1.02,1),ATRIB(4)=8,1;
        ACT,,,OI;                     DMAIN G3
        CREATE,XX(4),,1,180,1;             UNIT LOC RPT (FM SEC)
        ASSIGN,ATRIB(2)=126,ATRIB(3)=TRIAG(0.82,0.92,1.02,1),ATRIB(4)=8,1;
        ACT,,,OI;                     DMAIN G3
        CREATE,XX(4),,1,180,1;             UNIT LOC RPT (FM SEC)
        ASSIGN,ATRIB(2)=126,ATRIB(3)=TRIAG(0.82,0.92,1.02,1),ATRIB(4)=8,1;
        ACT,,,OI;                     DMAIN G3
        CREATE,XX(4),,1,180,1;             UNIT LOC RPT (FM SEC)
        ASSIGN,ATRIB(2)=126,ATRIB(3)=TRIAG(0.82,0.92,1.02,1),ATRIB(4)=8,1;
        ACT,,,OI;                     DMAIN G3
;
        CREATE,XX(1),,1,30,1;            NBC DEF CO STAT RPT (TTY)
        ASSIGN,ATRIB(2)=1067,ATRIB(3)=TRIAG(1.30,1.40,1.50,1),ATRIB(4)=2,1;
        ACT,,,OI;                     DMAIN G3
;
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CREATE,XX(2),,1,60,1;            CNTR FIRE STAT RPT (FM SEC)
ASSIGN,ATRIB(2)=1031,ATRIB(3)=TRIAG(0.58,0.68,0.78,1),ATRIB(4)=8,1;
ACT,,,OI;                        DMAIN G3
CREATE,XX(2),,1,60,1;            CNTR FIRE STAT RPT (FM SEC)
ASSIGN,ATRIB(2)=1031,ATRIB(3)=TRIAG(0.58,0.68,0.78,1),ATRIB(4)=8,1;
ACT,,,OI;                        DMAIN G3
CREATE,XX(2),,1,60,1;            CNTR FIRE STAT RPT (FM SEC)
ASSIGN,ATRIB(2)=1031,ATRIB(3)=TRIAG(0.58,0.68,0.78,1),ATRIB(4)=8,1;
ACT,,,OI;                        DMAIN G3
CREATE,XX(2),,1,60,1;            CNTR FIRE STAT RPT (FM SEC)
ASSIGN,ATRIB(2)=1031,ATRIB(3)=TRIAG(0.58,0.68,0.78,1),ATRIB(4)=8,1;
ACT,,,OI;                        DMAIN G3
CREATE,XX(2),,1,60,1;            CNTR FIRE STAT RPT (FM SEC)
ASSIGN,ATRIB(2)=1031,ATRIB(3)=TRIAG(0.58,0.68,0.78,1),ATRIB(4)=8,1;
ACT,,,OI;                        DMAIN G3
CREATE,XX(2),,1,60,1;            CNTR FIRE STAT RPT (FM SEC)
ASSIGN,ATRIB(2)=1031,ATRIB(3)=TRIAG(0.58,0.68,0.78,1),ATRIB(4)=8,1;
ACT,,,OI;                        DMAIN G3
CREATE,XX(2),,1,60,1;            CNTR FIRE STAT RPT (FM SEC)
ASSIGN,ATRIB(2)=1031,ATRIB(3)=TRIAG(0.58,0.68,0.78,1),ATRIB(4)=8,1;
ACT,,,OI;                        DMAIN G3
CREATE,XX(2),,1,60,1;            CNTR FIRE STAT RPT (FM SEC)
ASSIGN,ATRIB(2)=1031,ATRIB(3)=TRIAG(0.58,0.68,0.78,1),ATRIB(4)=8,1;
ACT,,,OI;                        DMAIN G3
CREATE,XX(2),,1,60,1;            CNTR FIRE STAT RPT (FM SEC)
ASSIGN,ATRIB(2)=1031,ATRIB(3)=TRIAG(0.58,0.68,0.78,1),ATRIB(4)=8,1;
ACT,,,OI;                        DMAIN G3
;
CREATE,XX(1),,1,30,1;          CLASS 5 RPT (TTY)
ASSIGN,ATRIB(2)=1025,ATRIB(3)=TRIAG(0.93,1.03,1.13,1),ATRIB(4)=6,1;
ACT,,,MGS;                       DMAIN G4
;
CREATE,XX(1),,1,30,1;          EW STAT RPT (TTY)
ASSIGN,ATRIB(2)=116,ATRIB(3)=TRIAG(0.70,0.80,0.90,1),ATRIB(4)=4,1;
ACT,,,MSG;                       DMAIN G2
CREATE,XX(1),,1,30,1;          EW STAT RPT (TTY)
ASSIGN,ATRIB(2)=116,ATRIB(3)=TRIAG(0.70,0.80,0.90,1),ATRIB(4)=4,1;
ACT,,,MSG;                       DMAIN G2
CREATE,XX(1),,1,30,1;          EW STAT RPT (TTY)
ASSIGN,ATRIB(2)=116,ATRIB(3)=TRIAG(0.70,0.80,0.90,1),ATRIB(4)=4,1;
ACT,,,MSG;                       DMAIN G2
;
CREATE,XX(1),,1,30,1;          PERS SIT RPT (TTY)
ASSIGN,ATRIB(2)=104,ATRIB(3)=TRIAG(2.33,2.45,2.57,1),ATRIB(4)=2,1;
ACT,,,MGS;                       DMAIN G1
CREATE,XX(1),,1,30,1;          PERS SIT RPT (TTY)
ASSIGN,ATRIB(2)=104,ATRIB(3)=TRIAG(2.33,2.45,2.57,1),ATRIB(4)=2,1;
ACT,,,MGS;                       DMAIN G1
CREATE,XX(1),,1,30,1;          PERS SIT RPT (TTY)
ASSIGN,ATRIB(2)=104,ATRIB(3)=TRIAG(2.33,2.45,2.57,1),ATRIB(4)=2,1;
ACT,,,MGS;                       DMAIN G1
CREATE,XX(1),,1,30,1;          PERS SIT RPT (TTY)
ASSIGN,ATRIB(2)=104,ATRIB(3)=TRIAG(2.33,2.45,2.57,1),ATRIB(4)=2,1;
ACT,,,MGS;                       DMAIN G1
CREATE,XX(1),,1,30,1;          PERS SIT RPT (TTY)
```

```
ASSIGN,ATRIB(2)=104,ATRIB(3)=TRIAG(2.33,2.45,2.57,1),ATRIB(4)=2,1;
ACT,,,MGS;                    DMAIN G1
CREATE,XX(1),,1,30,1;            PERS SIT RPT (TTY)
ASSIGN,ATRIB(2)=104,ATRIB(3)=TRIAG(2.33,2.45,2.57,1),ATRIB(4)=2,1;
ACT,,,MGS;                    DMAIN G1
CREATE,XX(1),,1,30,1;            PERS SIT RPT (TTY)
ASSIGN,ATRIB(2)=104,ATRIB(3)=TRIAG(2.33,2.45,2.57,1),ATRIB(4)=2,1;
ACT,,,MGS;                    DMAIN G1
CREATE,XX(1),,1,30,1;            PERS SIT RPT (TTY)
ASSIGN,ATRIB(2)=104,ATRIB(3)=TRIAG(2.33,2.45,2.57,1),ATRIB(4)=2,1;
ACT,,,MGS;                    DMAIN G1
CREATE,XX(1),,1,30,1;            PERS SIT RPT (TTY)
ASSIGN,ATRIB(2)=104,ATRIB(3)=TRIAG(2.33,2.45,2.57,1),ATRIB(4)=2,1;
ACT,,,MGS;                    DMAIN G1
;
CREATE,XX(3),,1,120,1;             NBC WTHR/WIND RPT (TTY)
ASSIGN,ATRIB(2)=80,ATRIB(3)=TRIAG(0.62,0.72,0.82,1),ATRIB(4)=1,1;
ACT,,,MSG;                    DMAIN G3
;
CREATE,XX(3),,1,120,1;             CDRS SIT RPT (FM SEC)
ASSIGN,ATRIB(2)=59,ATRIB(3)=TRIAG(1.48,1.60,1.72,1),ATRIB(4)=8,1;
ACT,,,OI;                     DMAIN G3
CREATE,XX(3),,1,120,1;             CDRS SIT RPT (FM SEC)
ASSIGN,ATRIB(2)=59,ATRIB(3)=TRIAG(1.48,1.60,1.72,1),ATRIB(4)=8,1;
ACT,,,OI;                     DMAIN G3
CREATE,XX(3),,1,120,1;             CDRS SIT RPT (FM SEC)
ASSIGN,ATRIB(2)=59,ATRIB(3)=TRIAG(1.48,1.60,1.72,1),ATRIB(4)=8,1;
ACT,,,OI;                     DMAIN G3
CREATE,XX(3),,1,120,1;             CDRS SIT RPT (FM SEC)
ASSIGN,ATRIB(2)=59,ATRIB(3)=TRIAG(1.48,1.60,1.72,1),ATRIB(4)=8,1;
ACT,,,OI;                     DMAIN G3
CREATE,XX(3),,1,120,1;             CDRS SIT RPT (FM SEC)
ASSIGN,ATRIB(2)=59,ATRIB(3)=TRIAG(1.48,1.60,1.72,1),ATRIB(4)=8,1;
ACT,,,OI;                     DMAIN G3
CREATE,XX(3),,1,120,1;             CDRS SIT RPT (FM SEC)
ASSIGN,ATRIB(2)=59,ATRIB(3)=TRIAG(1.48,1.60,1.72,1),ATRIB(4)=8,1;
ACT,,,OI;                     DMAIN G3
CREATE,XX(3),,1,120,1;             CDRS SIT RPT (FM SEC)
ASSIGN,ATRIB(2)=59,ATRIB(3)=TRIAG(1.48,1.60,1.72,1),ATRIB(4)=8,1;
ACT,,,OI;                     DMAIN G3
CREATE,XX(3),,1,120,1;             CDRS SIT RPT (FM SEC)
ASSIGN,ATRIB(2)=59,ATRIB(3)=TRIAG(1.48,1.60,1.72,1),ATRIB(4)=8,1;
ACT,,,OI;                     DMAIN G3
CREATE,XX(3),,1,120,1;             CDRS SIT RPT (FM SEC)
ASSIGN,ATRIB(2)=59,ATRIB(3)=TRIAG(1.48,1.60,1.72,1),ATRIB(4)=8,1;
ACT,,,OI;                     DMAIN G3
;
CREATE,XX(2),,1,60,1;             ARTY SIT RPT (RATT)
ASSIGN,ATRIB(2)=35,ATRIB(3)=TRIAG(0.90,1.00,1.10,1),ATRIB(4)=3,1;
ACT,,,MSG;                    DMAIN G3
;
CREATE,XX(1),,1,30,1;            ECM SUM RPT (TTY)
ASSIGN,ATRIB(2)=32,ATRIB(3)=TRIAG(0.73,0.83,0.93,1),ATRIB(4)=5,1;
ACT,,,MSG;                    DMAIN G3
CREATE,XX(1),,1,30,1;            ECM SUM RPT (TTY)
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ASSIGN,ATRIB(2)=32,ATRIB(3)=TRIAG(0.73,0.83,0.93,1),ATRIB(4)=5,1;
ACT,,,MSG;                      DMAIN G3
CREATE,XX(1),,1,30,1;              ECM SUM RPT (TTY)
ASSIGN,ATRIB(2)=32,ATRIB(3)=TRIAG(0.73,0.83,0.93,1),ATRIB(4)=5,1;
ACT,,,MSG;                      DMAIN G3
CREATE,XX(1),,1,30,1;              ECM SUM RPT (TTY)
ASSIGN,ATRIB(2)=32,ATRIB(3)=TRIAG(0.73,0.83,0.93,1),ATRIB(4)=5,1;
ACT,,,MSG;                      DMAIN G3
CREATE,XX(1),,1,30,1;              ECM SUM RPT (TTY)
ASSIGN,ATRIB(2)=32,ATRIB(3)=TRIAG(0.73,0.83,0.93,1),ATRIB(4)=5,1;
ACT,,,MSG;                      DMAIN G3
CREATE,XX(1),,1,30,1;              ECM SUM RPT (TTY)
ASSIGN,ATRIB(2)=32,ATRIB(3)=TRIAG(0.73,0.83,0.93,1),ATRIB(4)=5,1;
ACT,,,MSG;                      DMAIN G3
CREATE,XX(1),,1,30,1;              ECM SUM RPT (TTY)
ASSIGN,ATRIB(2)=32,ATRIB(3)=TRIAG(0.73,0.83,0.93,1),ATRIB(4)=5,1:
ACT,,,MSG;                      DMAIN G3
CREATE,XX(1),,1,30,1;              ECM SUM RPT (TTY)
ASSIGN,ATRIB(2)=32,ATRIB(3)=TRIAG(0.73,0.83,0.93,1),ATRIB(4)=5,1;
ACT,,,MSG;                      DMAIN G3
CREATE,XX(1),,1,30,1;              ECM SUM RPT (TTY)
ASSIGN,ATRIB(2)=32,ATRIB(3)=TRIAG(0.73,0.83,0.93,1),ATRIB(4)=5,1;
ACT,,,MSG;                      DMAIN G3
;
CREATE,XX(1),,1,30,1;              LOSS RPT (TTY)
ASSIGN,ATRIB(2)=61,ATRIB(3)=TRIAG(0.62,0.72,0.82,1),ATRIB(4)=2,1;
ACT,,,MGS;                      DMAIN G4
;
CREATE,XX(1),,1,30,1;              AIR RQST (TTY)
ASSIGN,ATRIB(2)=55,ATRIB(3)=TRIAG(1.68,1.80,1.92,1),ATRIB(4)=3,1;
ACT,,,MSG;                      DMAIN G3
CREATE,XX(1),,1,30,1;              AIR RQST (TTY)
ASSIGN,ATRIB(2)=55,ATRIB(3)=TRIAG(1.68,1.80,1.92,1),ATRIB(4)=3,1;
ACT,,,MSG;                      DMAIN G3
CREATE,XX(1),,1,30,1;              AIR RQST (TTY)
ASSIGN,ATRIB(2)=55,ATRIB(3)=TRIAG(1.68,1.80,1.92,1),ATRIB(4)=3,1;
ACT,,,MSG;                      DMAIN G3
CREATE,XX(1),,1,30,1;              AIR RQST (TTY)
ASSIGN,ATRIB(2)=55,ATRIB(3)=TRIAG(1.68,1.80,1.92,1),ATRIB(4)=3,1;
ACT,,,MSG;                      DMAIN G3
CREATE,XX(1),,1,30,1;              AIR RQST (TTY)
ASSIGN,ATRIB(2)=55,ATRIB(3)=TRIAG(1.68,1.80,1.92,1),ATRIB(4)=3,1;
ACT,,,MSG;                      DMAIN G3
CREATE,XX(1),,1,30,1;              AIR RQST (TTY)
ASSIGN,ATRIB(2)=55,ATRIB(3)=TRIAG(1.68,1.80,1.92,1),ATRIB(4)=3,1;
ACT,,,MSG;                      DMAIN G3
CREATE,XX(1),,1,30,1;              AIR RQST (TTY)
ASSIGN,ATRIB(2)=55,ATRIB(3)=TRIAG(1.68,1.80,1.92,1),ATRIB(4)=3,1;
ACT,,,MSG;                      DMAIN G3
CREATE,XX(1),,1,30,1;              AIR RQST (TTY)
ASSIGN,ATRIB(2)=55,ATRIB(3)=TRIAG(1.68,1.80,1.92,1),ATRIB(4)=3,1;
ACT,,,MSG;                      DMAIN G3
CREATE,XX(1),,1,30,1;              AIR RQST (TTY)
ASSIGN,ATRIB(2)=55,ATRIB(3)=TRIAG(1.68,1.80,1.92,1),ATRIB(4)=3,1;
ACT,,,MSG;                      DMAIN G3
```

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;
CREATE,XX(1),,1,30,1;           PERS RQMT RPT (TTY)
ASSIGN,ATRIB(2)=19,ATRIB(3)=TRIAG(1.10,1.20,1.30,1),ATRIB(4)=2,1;
ACT,,,MGS;                      DMAIN G1
CREATE,XX(1),,1,30,1;           PERS RQMT RPT (TTY)
ASSIGN,ATRIB(2)=19,ATRIB(3)=TRIAG(1.10,1.20,1.30,1),ATRIB(4)=2,1;
ACT,,,MGS;                      DMAIN G1
CREATE,XX(1),,1,30,1;           PERS RQMT RPT (TTY)
ASSIGN,ATRIB(2)=19,ATRIB(3)=TRIAG(1.10,1.20,1.30,1),ATRIB(4)=2,1;
ACT,,,MGS;                      DMAIN G1
CREATE,XX(1),,1,30,1;           PERS RQMT RPT (TTY)
ASSIGN,ATRIB(2)=19,ATRIB(3)=TRIAG(1.10,1.20,1.30,1),ATRIB(4)=2,1;
ACT,,,MGS;                      DMAIN G1
CREATE,XX(1),,1,30,1;           PERS RQMT RPT (TTY)
ASSIGN,ATRIB(2)=19,ATRIB(3)=TRIAG(1.10,1.20,1.30,1),ATRIB(4)=2,1;
ACT,,,MGS;                      DMAIN G1
CREATE,XX(1),,1,30,1;           PERS RQMT RPT (TTY)
ASSIGN,ATRIB(2)=19,ATRIB(3)=TRIAG(1.10,1.20,1.30,1),ATRIB(4)=2,1;
ACT,,,MGS;                      DMAIN G1
CREATE,XX(1),,1,30,1;           PERS RQMT RPT (TTY)
ASSIGN,ATRIB(2)=19,ATRIB(3)=TRIAG(1.10,1.20,1.30,1),ATRIB(4)=2,1;
ACT,,,MGS;                      DMAIN G1
CREATE,XX(1),,1,30,1;           PERS RQMT RPT (TTY)
ASSIGN,ATRIB(2)=19,ATRIB(3)=TRIAG(1.10,1.20,1.30,1),ATRIB(4)=2,1;
ACT,,,MGS;                      DMAIN G1
CREATE,XX(1),,1,30,1;           PERS RQMT RPT (TTY)
ASSIGN,ATRIB(2)=19,ATRIB(3)=TRIAG(1.10,1.20,1.30,1),ATRIB(4)=2,1;
ACT,,,MGS;                      DMAIN G1
;
CREATE,XX(3),,1,120,1;              WTR PT STAT RPT (FM SEC)
ASSIGN,ATRIB(2)=1100,ATRIB(3)=TRIAG(0.62,0.72,0.82,1),ATRIB(4)=2,1;
ACT,,,OI;                       DMAIN G4
CREATE,XX(3),,1,120,1;              WTR PT STAT RPT (FM SEC)
ASSIGN,ATRIB(2)=1100,ATRIB(3)=TRIAG(0.62,0.72,0.82,1),ATRIB(4)=2,1;
ACT,,,OI;                       DMAIN G4
CREATE,XX(3),,1,120,1;              WTR PT STAT RPT (FM SEC)
ASSIGN,ATRIB(2)=1100,ATRIB(3)=TRIAG(0.62,0.72,0.82,1),ATRIB(4)=2,1;
ACT,,,OI;                       DMAIN G4
CREATE,XX(3),,1,120,1;              WTR PT STAT RPT (FM SEC)
ASSIGN,ATRIB(2)=1100,ATRIB(3)=TRIAG(0.62,0.72,0.82,1),ATRIB(4)=2,1;
ACT,,,OI;                       DMAIN G4
CREATE,XX(3),,1,120,1;              WTR PT STAT RPT (FM SEC)
ASSIGN,ATRIB(2)=1100,ATRIB(3)=TRIAG(0.62,0.72,0.82,1),ATRIB(4)=2,1;
ACT,,,OI;                       DMAIN G4
CREATE,XX(3),,1,120,1;              WTR PT STAT RPT (FM SEC)
ASSIGN,ATRIB(2)=1100,ATRIB(3)=TRIAG(0.62,0.72,0.82,1),ATRIB(4)=2,1;
ACT,,,OI;                       DMAIN G4
CREATE,XX(3),,1,120,1;              WTR PT STAT RPT (FM SEC)
ASSIGN,ATRIB(2)=1100,ATRIB(3)=TRIAG(0.62,0.72,0.82,1),ATRIB(4)=2,1;
ACT,,,OI;                       DMAIN G4
CREATE,XX(3),,1,120,1;              WTR PT STAT RPT (FM SEC)
ASSIGN,ATRIB(2)=1100,ATRIB(3)=TRIAG(0.62,0.72,0.82,1),ATRIB(4)=2,1;
ACT,,,OI;                       DMAIN G4
CREATE,XX(3),,1,120,1;              WTR PT STAT RPT (FM SEC)
ASSIGN,ATRIB(2)=1100,ATRIB(3)=TRIAG(0.62,0.72,0.82,1),ATRIB(4)=2,1;
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ACT,,,OI;                     DMAIN G4
:
CREATE,XX(3),,1,120,1;             SIT UPDT RPT (RATT)
ASSIGN,ATRIB(2)=1091,ATRIB(3)=TRIAG(1.07,1.17,1.27,1),ATRIB(4)=1,1;
ACT,,,MSG;                    DMAIN G3
CREATE,XX(3),,1,120,1;             SIT UPDT RPT (RATT)
ASSIGN,ATRIB(2)=1091,ATRIB(3)=TRIAG(1.07,1.17,1.27,1),ATRIB(4)=1,1;
ACT,,,MSG;                    DMAIN G3
CREATE,XX(3),,1,120,1;             SIT UPDT RPT (RATT)
ASSIGN,ATRIB(2)=1091,ATRIB(3)=TRIAG(1.07,1.17,1.27,1),ATRIB(4)=1,1;
ACT,,,MSG;                    DMAIN G3
CREATE,XX(3),,1,120,1;             SIT UPDT RPT (RATT)
ASSIGN,ATRIB(2)=1091,ATRIB(3)=TRIAG(1.07,1.17,1.27,1),ATRIB(4)=1,1;
ACT,,,MSG;                    DMAIN G3
CREATE,XX(3),,1,120,1;             SIT UPDT RPT (RATT)
ASSIGN,ATRIB(2)=1091,ATRIB(3)=TRIAG(1.07,1.17,1.27,1),ATRIB(4)=1,1;
ACT,,,MSG;                    DMAIN G3
CREATE,XX(3),,1,120,1;             SIT UPDT RPT (RATT)
ASSIGN,ATRIB(2)=1091,ATRIB(3)=TRIAG(1.07,1.17,1.27,1),ATRIB(4)=1,1;
ACT,,,MSG;                    DMAIN G3
CREATE,XX(3),,1,120,1;             SIT UPDT RPT (RATT)
ASSIGN,ATRIB(2)=1091,ATRIB(3)=TRIAG(1.07,1.17,1.27,1),ATRIB(4)=1,1;
ACT,,,MSG;                    DMAIN G3
CREATE,XX(3),,1,120,1;             SIT UPDT RPT (RATT)
ASSIGN,ATRIB(2)=1091,ATRIB(3)=TRIAG(1.07,1.17,1.27,1),ATRIB(4)=1,1;
ACT,,,MSG;                    DMAIN G3
CREATE,XX(3),,1,120,1;             SIT UPDT RPT (RATT)
ASSIGN,ATRIB(2)=1091,ATRIB(3)=TRIAG(1.07,1.17,1.27,1),ATRIB(4)=1,1:
ACT,,,MSG;                    DMAIN G3
:
CREATE,XX(1),,1,30,1;            RAD STAT RPT (FM SEC)
ASSIGN,ATRIB(2)=1081,ATRIB(3)=TRIAG(0.72,0.82,0.92,1),ATRIB(4)=7,1;
ACT,,,OI;                     DMAIN G2
CREATE,XX(1),,1,30,1;            RAD STAT RPT (FM SEC)
ASSIGN,ATRIB(2)=1081,ATRIB(3)=TRIAG(0.72,0.82,0.92,1),ATRIB(4)=7,1;
ACT,,,OI;                     DMAIN G2
CREATE,XX(1),,1,30,1;            RAD STAT RPT (FM SEC)
ASSIGN,ATRIB(2)=1081,ATRIB(3)=TRIAG(0.72,0.82,0.92,1),ATRIB(4)=7,1;
ACT,,,OI;                     DMAIN G2
CREATE,XX(1),,1,30,1;            RAD STAT RPT (FM SEC)
ASSIGN,ATRIB(2)=1081,ATRIB(3)=TRIAG(0.72,0.82,0.92,1),ATRIB(4)=7,1;
ACT,,,OI;                     DMAIN G2
CREATE,XX(1),,1,30,1;            RAD STAT RPT (FM SEC)
ASSIGN,ATRIB(2)=1081,ATRIB(3)=TRIAG(0.72,0.82,0.92,1),ATRIB(4)=7,1;
ACT,,,OI;                     DMAIN G2
CREATE,XX(1),,1,30,1:            RAD STAT RPT (FM SEC)
ASSIGN,ATRIB(2)=1081,ATRIB(3)=TRIAG(0.72,0.82,0.92,1),ATRIB(4)=7,1;
ACT,,,OI;                     DMAIN G2
CREATE,XX(1),,1,30,1;            RAD STAT RPT (FM SEC)
ASSIGN,ATRIB(2)=1081,ATRIB(3)=TRIAG(0.72,0.82,0.92,1),ATRIB(4)=7,1;
ACT,,,OI;                     DMAIN G2
CREATE,XX(1),,1,30,1;            RAD STAT RPT (FM SEC)
ASSIGN,ATRIB(2)=1081,ATRIB(3)=TRIAG(0.72,0.82,0.92,1),ATRIB(4)=7,1;
ACT,,,OI;                     DMAIN G2
CREATE,XX(1),,1,30,1;            RAD STAT RPT (FM SEC)
```

```
        ASSIGN,ATRIB(2)=1081,ATRIB(3)=TRIAG(0.72,0.82,0.92,1),ATRIB(4)=7,1:
        ACT,,,OI;                       DMAIN G2
;
        CREATE,XX(1),,1,30,1;             COMSEC STAT RPT (RATT)
        ASSIGN,ATRIB(2)=1030,ATRIB(3)=TRIAG(0.73,0.83,0.93,1),ATRIB(4)=1,1;
        ACT,,,MSG;                      DMAIN G2
;
        CREATE,XX(2),,1,60,1;              CLASS 3 RPT (TTY)
        ASSIGN,ATRIB(2)=1024,ATRIB(3)=TRIAG(1.02,1.12,1.22,1),ATRIB(4)=2,1;
        ACT,,,MGS;                      DMAIN G4
;
        CREATE,XX(2),,1,60,1;              ARTY SIT RPT (RATT)
        ASSIGN,ATRIB(2)=1013,ATRIB(3)=TRIAG(1.07,1.17,1.27,1),ATRIB(4)=1,1:
        ACT,,,MSG;                      DMAIN G3
;
        CREATE,XX(1),,1,30,1;             ENGR SIT RPT (TTY)
        ASSIGN,ATRIB(2)=115,ATRIB(3)=TRIAG(3.85,3.97,4.12,1),ATRIB(4)=2,1:
        ACT,,,MSG;                      DMAIN G3
;
OI      AWAIT(1),NET/1,,1;
          ACT/44,,ATRIB(4).EQ.2,R4;
          ACT/55,,ATRIB(4).EQ.7,R2;
          ACT/66,,ATRIB(4).EQ.8,R6;
R6      AWAIT(4),OP2/1,,1;
          ACT/1,ATRIB(3);
        FREE,NET/1,1;
        FREE,OP2/1,1;
        ACT,,,CL2;
R4      AWAIT(11),OP4/1,,1;
          ACT/2,ATRIB(3);
        FREE,NET/1,1;
        FREE,OP4/1,1;
        ACT,,,CL2;
R2      AWAIT(20),OP3/1,,1;
          ACT/1,ATRIB(3);
        FREE,NET/1,1;
        FREE,OP3/1,1;
        ACT,,,CL2;
;
MGS     GOON;
        AWAIT(26),JEPE;
        ACT,,,CON;
;
MSG     GOON;
        AWAIT(2),JEEP;
CON     GOON;
;
CL2       GOON;
          ACT,,,CL1;
;
CL1       COLCT,INT(1),TIS,,1;
          ACT/99;
          TERM;
          END;
;
```

```
INIT,0,53200;
INTLC,XX(1)=1440,XX(2)=720,XX(3)=360,XX(4)=240,XX(5)=9.8;
FIN;
```

APPENDIX C

Modification 1 / Dispersed 2 DTOC

```
GEN,MENGLERT,THESIS,10/28/85,1,NO,YES,YES,YES,YES/1,132;
LIMITS,26,10,10000;
NETWORK;
;
;  TIME IS MINUTES
;
        RESOURCE/NET(1),1;                                  O/I FM SEC NET
        RESOURCE/INT(1),13,14,15,16,17,18,24,25;            INTERNAL TOC NET
        RESOURCE/OP1(1),3,9,19,13,14,15,16,17,18;           CMD CELL RTO
        RESOURCE/OP2(1),3,9,13,14,15,16,17,18,25;           CRNT OPS RTO
        RESOURCE/OP3(1),19,24;                              CRNT OPS RTO
        RESOURCE/OP4(1),3,9,19,13,15,18;                    CSS      RTO
        RESOURCE/OP5(1),3,9,19,13,14,15,16,17,18;           PLANS    RTO
        RESOURCE/OP6(1),3,19,13,16,17;                      INTEL    RTO
        RESOURCE/OP7(1),13,14,16,18,24,25;                  FSE      RTO
;
        GATE/JEEP,CLOSE,2;
        GATE/JEPE,CLOSE,26;
        CREATE,60,,1.720,1;
          ACT/20,XX(5);
        OPEN,JEEP;
          ACT/21,XX(5);
        OPEN,JEPE;
          ACT/22,10;
        CLOSE,JEEP;
        CLOSE,JEPE;
        TERM;
;
        CREATE,XX(2),,1,60,1;           INTEL SUM RPT (RATT)
        ASSIGN,ATRIB(2)=9,ATRIB(3)=TRIAG(1.77,1.88,2.00,1),ATRIB(4)=5,1;
          ACT,,,MSG;                DMAIN G2
;
        CREATE,XX(2),,1,60,1;           AD STAT RPT (FM SEC)
        ASSIGN,ATRIB(2)=24,ATRIB(3)=TRIAG(1.45,1.57,1.68,1),ATRIB(4)=8,1;
          ACT,,,OI;                 DMAIN G3
        CREATE,XX(2),,1,60,1;
        ASSIGN,ATRIB(2)=24,ATRIB(3)=TRIAG(1.45,1.57,1.68,1),ATRIB(4)=8,1;
          ACT,,,OI;
        CREATE,XX(2),,1,60,1;
        ASSIGN,ATRIB(2)=24,ATRIB(3)=TRIAG(1.45,1.57,1.68,1),ATRIB(4)=8,1;
          ACT,,,OI;
        CREATE,XX(2),,1,60,1;
        ASSIGN,ATRIB(2)=24,ATRIB(3)=TRIAG(1.45,1.57,1.68,1),ATRIB(4)=8,1;
          ACT,,,OI;
;
        CREATE,XX(3),,1,120,1;          CHEM DNWIND MSG (TTY)
```

```
ASSIGN,ATRIB(2)=27,ATRIB(3)=TRIAG(1.27,1.37,1.47,1),ATRIB(4)=1,1;
  ACT,,,MSG;              DMAIN G3
;
CREATE,XX(1),,1,30,1;          AVN STAT RPT (FM SEC)
ASSIGN,ATRIB(2)=57,ATRIB(3)=TRIAG(0.93,1.03,1.13,1),ATRIB(4)=8,1;
  ACT,,,OI;               DMAIN G3
;
CREATE,XX(1),,1,30,1;          POW RPT (RATT)
ASSIGN,ATRIB(2)=66,ATRIB(3)=TRIAG(1.10,1.20,1.30,1),ATRIB(4)=4,1;
  ACT,,,MGS;              DMAIN G1
CREATE,XX(1),,1,30,1;
ASSIGN,ATRIB(2)=66,ATRIB(3)=TRIAG(1.10,1.20,1.30,1),ATRIB(4)=4,1;
  ACT,,,MGS;
CREATE,XX(1),,1,30,1;
ASSIGN,ATRIB(2)=66,ATRIB(3)=TRIAG(1.10,1.20,1.30,1),ATRIB(4)=4,1;
  ACT,,,MGS;
CREATE,XX(1),,1,30,1;
ASSIGN,ATRIB(2)=66,ATRIB(3)=TRIAG(1.10,1.20,1.30,1),ATRIB(4)=4,1;
  ACT,,,MGS;
CREATE,XX(1),,1,30,1;
ASSIGN,ATRIB(2)=66,ATRIB(3)=TRIAG(1.10,1.20,1.30,1),ATRIB(4)=4,1;
  ACT,,,MGS;
CREATE,XX(1),,1,30,1;
ASSIGN,ATRIB(2)=66,ATRIB(3)=TRIAG(1.10,[illegible]ATRIB(4)=4,1;
  ACT,,,MGS;
CREATE,XX(1),,1,30,1;
ASSIGN,ATRIB(2)=66,ATRIB(3)=TRIA[illegible]=4,1;
  ACT,,,MGS;
CREATE,XX(1),,1,30,1;
ASSIGN,ATRIB(2)=66,ATRIB(3)=TRIA[illegible]=4,1;
  ACT,,,MGS;
CREATE,XX(1),,1,30,1;
ASSIGN,ATRIB(2)=66,ATRIB(3)=TRIA[illegible]=4,1;
  ACT,,,MGS;
;
CREATE,XX(1),,1,30,1;            [illegible]
ASSIGN,ATRIB(2)=1047,ATRIB(3)=TRIA[illegible]=2,1;
ACT,,,MGS;                 DMAIN [illegible]
CREATE,XX(1),,1,30,1;            EQUIP WRAP[illegible]
ASSIGN,ATRIB(2)=1047,ATRIB(3)=TRIA[illegible]ATRIB(4)=2,1;
ACT,,,MGS;                 DMAIN G4
CREATE,XX(1),,1,30,1;            EQUIP WRA[illegible]
ASSIGN,ATRIB(2)=1047,ATRIB(3)=TRIAG(0.62,[illegible]ATRIB(4)=2,1;
ACT,,,MGS;                 DMAIN G4
CREATE,XX(1),,1,30,1;            EQUIP WRAPUP RPT (TTY)
ASSIGN,ATRIB(2)=1047,ATRIB(3)=TRIAG(0.62,0.72,0.82,1),ATRIB(4)=2,1;
ACT,,,MGS;                 DMAIN G4
CREATE,XX(1),,1,30,1;            EQUIP WRAPUP RPT (TTY)
ASSIGN,ATRIB(2)=1047,ATRIB(3)=TRIAG(0.62,0.72,0.82,1),ATRIB(4)=2,1;
ACT,,,MGS;                 DMAIN G4
CREATE,XX(1),,1,30,1;            EQUIP WRAPUP RPT (TTY)
ASSIGN,ATRIB(2)=1047,ATRIB(3)=TRIAG(0.62,0.72,0.82,1),ATRIB(4)=2,1;
ACT,,,MGS;                 DMAIN G4
CREATE,XX(1),,1,30,1;            EQUIP WRAPUP RPT (TTY)
ASSIGN,ATRIB(2)=1047,ATRIB(3)=TRIAG(0.62,0.72,0.82,1),ATRIB(4)=2,1;
```

```
ACT,,,MGS;                        DMAIN G4
CREATE,XX(1),,1,30,1;                 EQUIP WRAPUP RPT (TTY)
ASSIGN,ATRIB(2)=1047,ATRIB(3)=TRIAG(0.62,0.72,0.82,1),ATRIB(4)=2,1;
ACT,,,MGS;                        DMAIN G4
CREATE,XX(1),,1,30,1;                 EQUIP WRAPUP RPT (TTY)
ASSIGN,ATRIB(2)=1047,ATRIB(3)=TRIAG(0.62,0.72,0.82,1),ATRIB(4)=2,1;
ACT,,,MGS;                        DMAIN G4
;
CREATE,XX(1),,1,30,1;                 ENGR ASSES RPT (FM SEC)
ASSIGN,ATRIB(2)=1041,ATRIB(3)=TRIAG(1.22,1.32,1.42,1),ATRIB(4)=9,1;
ACT,,,OI;                         DMAIN G3
;
CREATE,XX(1),,1,30,1;                  DS MAINT RPT (TTY)
ASSIGN,ATRIB(2)=1035,ATRIB(3)=TRIAG(1.23,1.33,1.43,1),ATRIB(4)=2,1;
ACT,,,MGS;                        DMAIN G4
CREATE,XX(1),,1,30,1;
ASSIGN,ATRIB(2)=1035,ATRIB(3)=TRIAG(1.23,1.33,1.43,1),ATRIB(4)=2,1;
ACT,,,MGS;                        DMAIN G4
CREATE,XX(1),,1,30,1;
ASSIGN,ATRIB(2)=1035,ATRIB(3)=TRIAG(1.23,1.33,1.43,1),ATRIB(4)=2,1;
ACT,,,MGS;                        DMAIN G4
CREATE,XX(1),,1,30,1;
ASSIGN,ATRIB(2)=1035,ATRIB(3)=TRIAG(1.23,1.33,1.43,1),ATRIB(4)=2,1;
ACT,,,MGS;                        DMAIN G4
;
CREATE,XX(4),,1,180,1;                  UNIT LOC RPT (FM SEC)
ASSIGN,ATRIB(2)=126,ATRIB(3)=TRIAG(0.82,0.92,1.02,1),ATRIB(4)=8,1;
ACT,,,OI;                         DMAIN G3
CREATE,XX(4),,1,180,1;                  UNIT LOC RPT (FM SEC)
ASSIGN,ATRIB(2)=126,ATRIB(3)=TRIAG(0.82,0.92,1.02,1),ATRIB(4)=8,1;
ACT,,,OI;                         DMAIN G3
CREATE,XX(4),,1,180,1;                  UNIT LOC RPT (FM SEC)
ASSIGN,ATRIB(2)=126,ATRIB(3)=TRIAG(0.82,0.92,1.02,1),ATRIB(4)=8,1;
ACT,,,OI;                         DMAIN G3
CREATE,XX(4),,1,180,1;                  UNIT LOC RPT (FM SEC)
ASSIGN,ATRIB(2)=126,ATRIB(3)=TRIAG(0.82,0.92,1.02,1),ATRIB(4)=8,1;
ACT,,,OI;                         DMAIN G3
CREATE,XX(4),,1,180,1;                  UNIT LOC RPT (FM SEC)
ASSIGN,ATRIB(2)=126,ATRIB(3)=TRIAG(0.82,0.92,1.02,1),ATRIB(4)=8,1;
ACT,,,OI;                         DMAIN G3
CREATE,XX(4),,1,180,1;                  UNIT LOC RPT (FM SEC)
ASSIGN,ATRIB(2)=126,ATRIB(3)=TRIAG(0.82,0.92,1.02,1),ATRIB(4)=8,1;
ACT,,,OI;                         DMAIN G3
CREATE,XX(4),,1,180,1;                  UNIT LOC RPT (FM SEC)
ASSIGN,ATRIB(2)=126,ATRIB(3)=TRIAG(0.82,0.92,1.02,1),ATRIB(4)=8,1;
ACT,,,OI;                         DMAIN G3
CREATE,XX(4),,1,180,1;                  UNIT LOC RPT (FM SEC)
ASSIGN,ATRIB(2)=126,ATRIB(3)=TRIAG(0.82,0.92,1.02,1),ATRIB(4)=8,1;
ACT,,,OI;                         DMAIN G3
CREATE,XX(4),,1,180,1;                  UNIT LOC RPT (FM SEC)
ASSIGN,ATRIB(2)=126,ATRIB(3)=TRIAG(0.82,0.92,1.02,1),ATRIB(4)=8,1;
ACT,,,OI;                         DMAIN G3
;
CREATE,XX(1),,1,30,1;                 NBC DEF CO STAT RPT (TTY)
ASSIGN,ATRIB(2)=1067,ATRIB(3)=TRIAG(1.30,1.40,1.50,1),ATRIB(4)=9,1;
```

```
        ACT,,,OI;                    DMAIN G3
;
        CREATE,XX(2),,1,60,1;              CNTR FIRE STAT RPT (FM SEC)
        ASSIGN,ATRIB(2)=1031,ATRIB(3)=TRIAG(0.58,0.68,0.78,1),ATRIB(4)=8,1;
        ACT,,,OI;                    DMAIN G3
        CREATE,XX(2),,1,60,1;              CNTR FIRE STAT RPT (FM SEC)
        ASSIGN,ATRIB(2)=1031,ATRIB(3)=TRIAG(0.58,0.68,0.78,1),ATRIB(4)=8,1;
        ACT,,,OI;                    DMAIN G3
        CREATE,XX(2),,1,60,1;              CNTR FIRE STAT RPT (FM SEC)
        ASSIGN,ATRIB(2)=1031,ATRIB(3)=TRIAG(0.58,0.68,0.78,1),ATRIB(4)=8,1;
        ACT,,,OI;                    DMAIN G3
        CREATE,XX(2),,1,60,1;              CNTR FIRE STAT RPT (FM SEC)
        ASSIGN,ATRIB(2)=1031,ATRIB(3)=TRIAG(0.58,0.68,0.78,1),ATRIB(4)=8,1;
        ACT,,,OI;                    DMAIN G3
        CREATE,XX(2),,1,60,1;              CNTR FIRE STAT RPT (FM SEC)
        ASSIGN,ATRIB(2)=1031,ATRIB(3)=TRIAG(0.58,0.68,0.78,1),ATRIB(4)=8,1;
        ACT,,,OI;                    DMAIN G3
        CREATE,XX(2),,1,60,1;              CNTR FIRE STAT RPT (FM SEC)
        ASSIGN,ATRIB(2)=1031,ATRIB(3)=TRIAG(0.58,0.68,0.78,1),ATRIB(4)=8,1;
        ACT,,,OI;                    DMAIN G3
        CREATE,XX(2),.1,60,1;              CNTR FIRE STAT RPT (FM SEC)
        ASSIGN,ATRIB(2)=1031,ATRIB(3)=TRIAG(0.58,0.68,0.78,1),ATRIB(4)=8,1;
        ACT,,,OI;                    DMAIN G3
        CREATE,XX(2),,1,60,1;              CNTR FIRE STAT RPT (FM SEC)
        ASSIGN,ATRIB(2)=1031,ATRIB(3)=TRIAG(0.58,0.68,0.78,1),ATRIB(4)=8,1;
        ACT,,,OI;                    DMAIN G3
        CREATE,XX(2),,1,60,1;              CNTR FIRE STAT RPT (FM SEC)
        ASSIGN,ATRIB(2)=1031,ATRIB(3)=TRIAG(0.58,0.68,0.78,1),ATRIB(4)=8,1;
        ACT,,,OI;                    DMAIN G3
;
        CREATE,XX(1),,1,30,1;             CLASS 5 RPT (TTY)
        ASSIGN,ATRIB(2)=1025,ATRIB(3)=TRIAG(0.93,1.03,1.13,1).ATRIB(4)=6,1;
        ACT,,,MGS;                   DMAIN G4
;
        CREATE,XX(1),,1,30,1;             EW STAT RPT (TTY)
        ASSIGN,ATRIB(2)=116,ATRIB(3)=TRIAG(0.70,0.80,0.90,1),ATRIB(4)=4,1;
        ACT,,,MSG;                   DMAIN G2
        CREATE,XX(1),,1,30,1;             EW STAT RPT (TTY)
        ASSIGN,ATRIB(2)=116,ATRIB(3)=TRIAG(0.70,0.80,0.90,1),ATRIB(4)=4,1;
        ACT,,,MSG;                   DMAIN G2
        CREATE,XX(1),,1,30,1;             EW STAT RPT (TTY)
        ASSIGN,ATRIB(2)=116,ATRIB(3)=TRIAG(0.70,0.80,0.90,1),ATRIB(4)=4,1;
        ACT,,,MSG;                   DMAIN G2
;
        CREATE,XX(1),,1,30,1;             PERS SIT RPT (TTY)
        ASSIGN,ATRIB(2)=104,ATRIB(3)=TRIAG(2.33,2.45,2.57,1),ATRIB(4)=2,1;
        ACT,,,MGS;                   DMAIN G1
        CREATE,XX(1),,1,30,1;             PERS SIT RPT (TTY)
        ASSIGN,ATRIB(2)=104,ATRIB(3)=TRIAG(2.33,2.45,2.57,1),ATRIB(4)=2,1;
        ACT,,,MGS;                   DMAIN G1
        CREATE,XX(1),,1,30,1;             PERS SIT RPT (TTY)
        ASSIGN,ATRIB(2)=104,ATRIB(3)=TRIAG(2.33,2.45,2.57,1),ATRIB(4)=2,1;
        ACT,,,MGS;                   DMAIN G1
        CREATE,XX(1),,1,30,1;             PERS SIT RPT (TTY)
        ASSIGN,ATRIB(2)=104,ATRIB(3)=TRIAG(2.33,2.45,2.57,1),ATRIB(4)=2,1;
```

```
ACT,,,MGS;                    DMAIN G1
CREATE,XX(1),,1,30,1;             PERS SIT RPT (TTY)
ASSIGN,ATRIB(2)=104,ATRIB(3)=TRIAG(2.33,2.45,2.57,1),ATRIB(4)=2,1;
ACT,,,MGS;                    DMAIN G1
CREATE,XX(1),,1,30,1;             PERS SIT RPT (TTY)
ASSIGN,ATRIB(2)=104,ATRIB(3)=TRIAG(2.33,2.45,2.57,1),ATRIB(4)=2,1;
ACT,,,MGS;                    DMAIN G1
CREATE,XX(1),,1,30,1;             PERS SIT RPT (TTY)
ASSIGN,ATRIB(2)=104,ATRIB(3)=TRIAG(2.33,2.45,2.57,1),ATRIB(4)=2,1;
ACT,,,MGS;                    DMAIN G1
CREATE,XX(1),,1,30,1;             PERS SIT RPT (TTY)
ASSIGN,ATRIB(2)=104,ATRIB(3)=TRIAG(2.33,2.45,2.57,1),ATRIB(4)=2,1;
ACT,,,MGS;                    DMAIN G1
CREATE,XX(1),,1,30,1;             PERS SIT RPT (TTY)
ASSIGN,ATRIB(2)=104,ATRIB(3)=TRIAG(2.33,2.45,2.57,1),ATRIB(4)=2,1;
ACT,,,MGS;                    DMAIN G1
;
CREATE,XX(3),,1,120,1;              NBC WTHR/WIND RPT (TTY)
ASSIGN,ATRIB(2)=80,ATRIB(3)=TRIAG(0.62,0.72,0.82,1),ATRIB(4)=1,1;
ACT,,,MSG;                    DMAIN G3
;
CREATE,XX(3),,1,120,1;              CDRS SIT RPT (FM SEC)
ASSIGN,ATRIB(2)=59,ATRIB(3)=TRIAG(1.48,1.60,1.72,1),ATRIB(4)=8,1;
ACT,,,OI;                     DMAIN G3
CREATE,XX(3),,1,120,1;              CDRS SIT RPT (FM SEC)
ASSIGN,ATRIB(2)=59,ATRIB(3)=TRIAG(1.48,1.60,1.72,1),ATRIB(4)=8,1;
ACT,,,OI;                     DMAIN G3
CREATE,XX(3),,1,120,1;              CDRS SIT RPT (FM SEC)
ASSIGN,ATRIB(2)=59,ATRIB(3)=TRIAG(1.48,1.60,1.72,1),ATRIB(4)=8,1;
ACT,,,OI;                     DMAIN G3
CREATE,XX(3),,1,120,1;              CDRS SIT RPT (FM SEC)
ASSIGN,ATRIB(2)=59,ATRIB(3)=TRIAG(1.48,1.60,1.72,1),ATRIB(4)=8,1;
ACT,,,OI;                     DMAIN G3
CREATE,XX(3),,1,120,1;              CDRS SIT RPT (FM SEC)
ASSIGN,ATRIB(2)=59,ATRIB(3)=TRIAG(1.48,1.60,1.72,1),ATRIB(4)=8,1;
ACT,,,OI;                     DMAIN G3
CREATE,XX(3),,1,120,1;              CDRS SIT RPT (FM SEC)
ASSIGN,ATRIB(2)=59,ATRIB(3)=TRIAG(1.48,1.60,1.72,1),ATRIB(4)=8,1;
ACT,,,OI;                     DMAIN G3
CREATE,XX(3),,1,120,1;              CDRS SIT RPT (FM SEC)
ASSIGN,ATRIB(2)=59,ATRIB(3)=TRIAG(1.48,1.60,1.72,1),ATRIB(4)=8,1;
ACT,,,OI;                     DMAIN G3
CREATE,XX(3),,1,120,1;              CDRS SIT RPT (FM SEC)
ASSIGN,ATRIB(2)=59,ATRIB(3)=TRIAG(1.48,1.60,1.72,1),ATRIB(4)=8,1;
ACT,,,OI;                     DMAIN G3
CREATE,XX(3),,1,120,1;              CDRS SIT RPT (FM SEC)
ASSIGN,ATRIB(2)=59,ATRIB(3)=TRIAG(1.48,1.60,1.72,1),ATRIB(4)=8,1;
ACT,,,OI;                     DMAIN G3
;
CREATE,XX(2),,1,60,1;              ARTY SIT RPT (RATT)
ASSIGN,ATRIB(2)=35,ATRIB(3)=TRIAG(0.90,1.00,1.10,1),ATRIB(4)=3,1;
ACT,,,MSG;                    DMAIN G3
;
CREATE,XX(1),,1,30,1;             ECM SUM RPT (TTY)
ASSIGN,ATRIB(2)=32,ATRIB(3)=TRIAG(0.73,0.83,0.93,1),ATRIB(4)=5,1;
```

```
ACT,,,MSG;                          DMAIN G3
CREATE,XX(1),,1,30,1;                   ECM SUM RPT (TTY)
ASSIGN,ATRIB(2)=32,ATRIB(3)=TRIAG(0.73,0.83,0.93,1),ATRIB(4)=5,1;
ACT,,,MSG;                          DMAIN G3
CREATE,XX(1),,1,30,1;                   ECM SUM RPT (TTY)
ASSIGN,ATRIB(2)=32,ATRIB(3)=TRIAG(0.73,0.83,0.93,1),ATRIB(4)=5,1;
ACT,,,MSG;                          DMAIN G3
CREATE,XX(1),,1,30,1;                   ECM SUM RPT (TTY)
ASSIGN,ATRIB(2)=32,ATRIB(3)=TRIAG(0.73,0.83,0.93,1),ATRIB(4)=5,1;
ACT,,,MSG;                          DMAIN G3
CREATE,XX(1),,1,30,1;                   ECM SUM RPT (TTY)
ASSIGN,ATRIB(2)=32,ATRIB(3)=TRIAG(0.73,0.83,0.93,1),ATRIB(4)=5,1;
ACT,,,MSG;                          DMAIN G3
CREATE,XX(1),,1,30,1;                   ECM SUM RPT (TTY)
ASSIGN,ATRIB(2)=32,ATRIB(3)=TRIAG(0.73,0.83,0.93,1),ATRIB(4)=5,1;
ACT,,,MSG;                          DMAIN G3
CREATE,XX(1),,1,30,1;                   ECM SUM RPT (TTY)
ASSIGN,ATRIB(2)=32,ATRIB(3)=TRIAG(0.73,0.83,0.93,1),ATRIB(4)=5,1;
ACT,,,MSG;                          DMAIN G3
CREATE,XX(1),,1,30,1;                   ECM SUM RPT (TTY)
ASSIGN,ATRIB(2)=32,ATRIB(3)=TRIAG(0.73,0.83,0.93,1),ATRIB(4)=5,1;
ACT,,,MSG;                          DMAIN G3
CREATE,XX(1),,1,30,1;                   ECM SUM RPT (TTY)
ASSIGN,ATRIB(2)=32,ATRIB(3)=TRIAG(0.73,0.83,0.93,1),ATRIB(4)=5,1;
ACT,,,MSG;                          DMAIN G3
;
CREATE,XX(1),,1,30,1;                   LOSS RPT (TTY)
ASSIGN,ATRIB(2)=61,ATRIB(3)=TRIAG(0.62,0.72,0.82,1),ATRIB(4)=2,1;
ACT,,,MGS;                          DMAIN G4
;
CREATE,XX(1),,1,30,1;                   AIR RQST (TTY)
ASSIGN,ATRIB(2)=55,ATRIB(3)=TRIAG(1.68,1.80,1.92,1),ATRIB(4)=3,1;
ACT,,,MSG;                          DMAIN G3
CREATE,XX(1),,1,30,1;                   AIR RQST (TTY)
ASSIGN,ATRIB(2)=55,ATRIB(3)=TRIAG(1.68,1.80,1.92,1),ATRIB(4)=3,1;
ACT,,,MSG;                          DMAIN G3
CREATE,XX(1),,1,30,1;                   AIR RQST (TTY)
ASSIGN,ATRIB(2)=55,ATRIB(3)=TRIAG(1.68,1.80,1.92,1),ATRIB(4)=3,1;
ACT,,,MSG;                          DMAIN G3
CREATE,XX(1),,1,30,1;                   AIR RQST (TTY)
ASSIGN,ATRIB(2)=55,ATRIB(3)=TRIAG(1.68,1.80,1.92,1),ATRIB(4)=3,1;
ACT,,,MSG;                          DMAIN G3
CREATE,XX(1),,1,30,1;                   AIR RQST (TTY)
ASSIGN,ATRIB(2)=55,ATRIB(3)=TRIAG(1.68,1.80,1.92,1),ATRIB(4)=3,1;
ACT,,,MSG;                          DMAIN G3
CREATE,XX(1),,1,30,1;                   AIR RQST (TTY)
ASSIGN,ATRIB(2)=55,ATRIB(3)=TRIAG(1.68,1.80,1.92,1),ATRIB(4)=3,1;
ACT,,,MSG;                          DMAIN G3
CREATE,XX(1),,1,30,1;                   AIR RQST (TTY)
ASSIGN,ATRIB(2)=55,ATRIB(3)=TRIAG(1.68,1.80,1.92,1),ATRIB(4)=3,1;
ACT,,,MSG;                          DMAIN G3
CREATE,XX(1),,1,30,1;                   AIR RQST (TTY)
ASSIGN,ATRIB(2)=55,ATRIB(3)=TRIAG(1.68,1.80,1.92,1),ATRIB(4)=3,1;
ACT,,,MSG;                          DMAIN G3
CREATE,XX(1),,1,30,1;                   AIR RQST (TTY)
```

```
ASSIGN,ATRIB(2)=55,ATRIB(3)=TRIAG(1.68,1.80,1.92,1),ATRIB(4)=3,1;
ACT,,,MSG;                    DMAIN G3
;
CREATE,XX(1),,1,30,1;            PERS RQMT RPT (TTY)
ASSIGN,ATRIB(2)=19,ATRIB(3)=TRIAG(1.10,1.20,1.30,1),ATRIB(4)=2,1;
ACT,,,MGS;                    DMAIN G1
CREATE,XX(1),,1,30,1;            PERS RQMT RPT (TTY)
ASSIGN,ATRIB(2)=19,ATRIB(3)=TRIAG(1.10,1.20,1.30,1),ATRIB(4)=2,1;
ACT,,,MGS;                    DMAIN G1
CREATE,XX(1),,1,30,1;            PERS RQMT RPT (TTY)
ASSIGN,ATRIB(2)=19,ATRIB(3)=TRIAG(1.10,1.20,1.30,1),ATRIB(4)=2,1;
ACT,,,MGS;                    DMAIN G1
CREATE,XX(1),,1,30,1;            PERS RQMT RPT (TTY)
ASSIGN,ATRIB(2)=19,ATRIB(3)=TRIAG(1.10,1.20,1.30,1),ATRIB(4)=2,1;
ACT,,,MGS;                    DMAIN G1
CREATE,XX(1),,1,30,1;            PERS RQMT RPT (TTY)
ASSIGN,ATRIB(2)=19,ATRIB(3)=TRIAG(1.10,1.20,1.30,1),ATRIB(4)=2,1;
ACT,,,MGS;                    DMAIN G1
CREATE,XX(1),,1,30,1;            PERS RQMT RPT (TTY)
ASSIGN,ATRIB(2)=19,ATRIB(3)=TRIAG(1.10,1.20,1.30,1),ATRIB(4)=2,1;
ACT,,,MGS;                    DMAIN G1
CREATE,XX(1),,1,30,1;            PERS RQMT RPT (TTY)
ASSIGN,ATRIB(2)=19,ATRIB(3)=TRIAG(1.10,1.20,1.30,1),ATRIB(4)=2,1;
ACT,,,MGS;                    DMAIN G1
CREATE,XX(1),,1,30,1;            PERS RQMT RPT (TTY)
ASSIGN,ATRIB(2)=19,ATRIB(3)=TRIAG(1.10,1.20,1.30,1),ATRIB(4)=2,1;
ACT,,,MGS;                    DMAIN G1
CREATE,XX(1),,1,30,1;            PERS RQMT RPT (TTY)
ASSIGN,ATRIB(2)=19,ATRIB(3)=TRIAG(1.10,1.20,1.30,1),ATRIB(4)=2,1;
ACT,,,MGS;                    DMAIN G1
;
CREATE,XX(3),,1,120,1;              WTR PT STAT RPT (FM SEC)
ASSIGN,ATRIB(2)=1100,ATRIB(3)=TRIAG(0.62,0.72,0.82,1),ATRIB(4)=9,1;
ACT,,,OI;                     DMAIN G4
CREATE,XX(3),,1,120,1;              WTR PT STAT RPT (FM SEC)
ASSIGN,ATRIB(2)=1100,ATRIB(3)=TRIAG(0.62,0.72,0.82,1),ATRIB(4)=9,1;
ACT,,,OI;                     DMAIN G4
CREATE,XX(3),,1,120,1;              WTR PT STAT RPT (FM SEC)
ASSIGN,ATRIB(2)=1100,ATRIB(3)=TRIAG(0.62,0.72,0.82,1),ATRIB(4)=9,1;
ACT,,,OI;                     DMAIN G4
CREATE,XX(3),,1,120,1;              WTR PT STAT RPT (FM SEC)
ASSIGN,ATRIB(2)=1100,ATRIB(3)=TRIAG(0.62,0.72,0.82,1),ATRIB(4)=9,1;
ACT,,,OI;                     DMAIN G4
CREATE,XX(3),,1,120,1;              WTR PT STAT RPT (FM SEC)
ASSIGN,ATRIB(2)=1100,ATRIB(3)=TRIAG(0.62,0.72,0.82,1),ATRIB(4)=9,1;
ACT,,,OI;                     DMAIN G4
CREATE,XX(3),,1,120,1;              WTR PT STAT RPT (FM SEC)
ASSIGN,ATRIB(2)=1100,ATRIB(3)=TRIAG(0.62,0.72,0.82,1),ATRIB(4)=9,1;
ACT,,,OI;                     DMAIN G4
CREATE,XX(3),,1,120,1;              WTR PT STAT RPT (FM SEC)
ASSIGN,ATRIB(2)=1100,ATRIB(3)=TRIAG(0.62,0.72,0.82,1),ATRIB(4)=9,1;
ACT,,,OI;                     DMAIN G4
CREATE,XX(3),,1,120,1;              WTR PT STAT RPT (FM SEC)
ASSIGN,ATRIB(2)=1100,ATRIB(3)=TRIAG(0.62,0.72,0.82,1),ATRIB(4)=9,1;
ACT,,,OI;                     DMAIN G4
```

```
CREATE,XX(3),,1,120,1;             WTR PT STAT RPT (FM SEC)
ASSIGN,ATRIB(2)=1100,ATRIB(3)=TRIAG(0.62,0.72,0.82,1),ATRIB(4)=9,1;
ACT,,,OI;                       DMAIN G4
;
CREATE,XX(3),,1,120,1;             SIT UPDT RPT (RATT)
ASSIGN,ATRIB(2)=1091,ATRIB(3)=TRIAG(1.07,1.17,1.27,1),ATRIB(4)=1,1;
ACT,,,MSG;                      DMAIN G3
CREATE,XX(3),,1,120,1;             SIT UPDT RPT (RATT)
ASSIGN,ATRIB(2)=1091,ATRIB(3)=TRIAG(1.07,1.17,1.27,1),ATRIB(4)=1,1;
ACT,,,MSG;                      DMAIN G3
CREATE,XX(3),,1,120,1:             SIT UPDT RPT (RATT)
ASSIGN,ATRIB(2)=1091,ATRIB(3)=TRIAG(1.07,1.17,1.27,1),ATRIB(4)=1,1;
ACT,,,MSG;                      DMAIN G3
CREATE,XX(3),,1,120,1;             SIT UPDT RPT (RATT)
ASSIGN,ATRIB(2)=1091,ATRIB(3)=TRIAG(1.07,1.17,1.27,1),ATRIB(4)=1,1;
ACT,,,MSG;                      DMAIN G3
CREATE,XX(3),,1,120,1;             SIT UPDT RPT (RATT)
ASSIGN,ATRIB(2)=1091,ATRIB(3)=TRIAG(1.07,1.17,1.27,1),ATRIB(4)=1,1;
ACT,,,MSG;                      DMAIN G3
CREATE,XX(3),,1,120,1;             SIT UPDT RPT (RATT)
ASSIGN,ATRIB(2)=1091,ATRIB(3)=TRIAG(1.07,1.17,1.27,1),ATRIB(4)=1,1;
ACT,,,MSG;                      DMAIN G3
CREATE,XX(3),,1,120,1;             SIT UPDT RPT (RATT)
ASSIGN,ATRIB(2)=1091,ATRIB(3)=TRIAG(1.07,1.17,1.27,1),ATRIB(4)=1,1;
ACT,,,MSG;                      DMAIN G3
CREATE,XX(3),,1,120,1;             SIT UPDT RPT (RATT)
ASSIGN,ATRIB(2)=1091,ATRIB(3)=TRIAG(1.07,1.17,1.27,1),ATRIB(4)=1,1;
ACT,,,MSG;                      DMAIN G3
CREATE,XX(3),,1,120,1;             SIT UPDT RPT (RATT)
ASSIGN,ATRIB(2)=1091,ATRIB(3)=TRIAG(1.07,1.17,1.27,1),ATRIB(4)=1,1;
ACT,,,MSG;                      DMAIN G3
;
CREATE,XX(1),,1,30,1;            RAD STAT RPT (FM SEC)
ASSIGN,ATRIB(2)=1081,ATRIB(3)=TRIAG(0.72,0.82,0.92,1),ATRIB(4)=7,1;
ACT,,,OI;                       DMAIN G2
CREATE,XX(1),,1,30,1;            RAD STAT RPT (FM SEC)
ASSIGN,ATRIB(2)=1081,ATRIB(3)=TRIAG(0.72,0.82,0.92,1),ATRIB(4)=7,1;
ACT,,,OI;                       DMAIN G2
CREATE,XX(1),,1,30,1;            RAD STAT RPT (FM SEC)
ASSIGN,ATRIB(2)=1081,ATRIB(3)=TRIAG(0.72,0.82,0.92,1),ATRIB(4)=7,1;
ACT,,,OI;                       DMAIN G2
CREATE,XX(1),,1,30,1;            RAD STAT RPT (FM SEC)
ASSIGN,ATRIB(2)=1081,ATRIB(3)=TRIAG(0.72,0.82,0.92,1),ATRIB(4)=7,1;
ACT,,,OI;                       DMAIN G2
CREATE,XX(1),,1,30,1;            RAD STAT RPT (FM SEC)
ASSIGN,ATRIB(2)=1081,ATRIB(3)=TRIAG(0.72,0.82,0.92,1),ATRIB(4)=7,1;
ACT,,,OI;                       DMAIN G2
CREATE,XX(1),,1,30,1;            RAD STAT RPT (FM SEC)
ASSIGN,ATRIB(2)=1081,ATRIB(3)=TRIAG(0.72,0.82,0.92,1),ATRIB(4)=7,1;
ACT,,,OI;                       DMAIN G2
CREATE,XX(1),,1,30,1;            RAD STAT RPT (FM SEC)
ASSIGN,ATRIB(2)=1081,ATRIB(3)=TRIAG(0.72,0.82,0.92,1),ATRIB(4)=7,1;
ACT,,,OI;                       DMAIN G2
CREATE,XX(1),,1,30,1;            RAD STAT RPT (FM SEC)
ASSIGN,ATRIB(2)=1081,ATRIB(3)=TRIAG(0.72,0.82,0.92,1),ATRIB(4)=7,1;
```

```
        ACT,,,OI;                          DMAIN G2
        CREATE,XX(1),,1,30,1;                 RAD STAT RPT (FM SEC)
        ASSIGN,ATRIB(2)=1081,ATRIB(3)=TRIAG(0.72,0.82,0.92,1),ATRIB(4)=7,1;
        ACT,,,OI;                          DMAIN G2
;
        CREATE,XX(1),,1,30,1;                 COMSEC STAT RPT (RATT)
        ASSIGN,ATRIB(2)=1030,ATRIB(3)=TRIAG(0.73,0.83,0.93,1),ATRIB(4)=1,1;
        ACT,,,MSG;                         DMAIN G2
;
        CREATE,XX(2),,1,60,1;                  CLASS 3 RPT (TTY)
        ASSIGN,ATRIB(2)=1024,ATRIB(3)=TRIAG(1.02,1.12,1.22,1),ATRIB(4)=2,1;
        ACT,,,MGS;                         DMAIN G4
;
        CREATE,XX(2),,1,60,1;                  ARTY SIT RPT (RATT)
        ASSIGN,ATRIB(2)=1013,ATRIB(3)=TRIAG(1.07,1.17,1.27,1),ATRIB(4)=1,1;
        ACT,,,MSG;                         DMAIN G3
;
        CREATE,XX(1),,1,30,1;                 ENGR SIT RPT (TTY)
        ASSIGN,ATRIB(2)=115,ATRIB(3)=TRIAG(3.85,3.97,4.12,1),ATRIB(4)=2,1;
        ACT,,,MSG;                         DMAIN G3
;
OI      AWAIT(1),NET/1,,1;
          ACT/44,,ATRIB(4).EQ.9,R4;
          ACT/55,,ATRIB(4).EQ.7,R2;
          ACT/66,,ATRIB(4).EQ.8,R6;
          ACT/100;
          TERM;
R6      AWAIT(3),ALLOC(9);
          ACT/1,ATRIB(3);
        FREE,NET/1,1;
        FREE,OP1/1,1;
        FREE,OP2/1,1;
        FREE,OP4/1,1;
        FREE,OP5/1,1;
        FREE,OP6/1,1;
        ACT,,,CL2;
R4      AWAIT(9),ALLOC(10);
          ACT/2,ATRIB(3);
        FREE,NET/1,1;
        FREE,OP1/1,1;
        FREE,OP2/1,1;
        FREE,OP4/1,1;
        FREE,OP5/1,1;
        ACT,,,CL2;
R2      AWAIT(19),ALLOC(11);
          ACT/1,ATRIB(3);
        FREE,NET/1,1;
        FREE,OP1/1,1;
        FREE,OP3/1,1;
        FREE,OP4/1,1;
        FREE,OP5/1,1;
        FREE,OP6/1,1;
        ACT,,,CL2;
;
MGS     GOON;
```

```
        AWAIT(26),JEPE;
        ACT,,,CON;
;
MSG     GOON;
        AWAIT(2),JEEP;
CON     GOON;
;
          ACT,,ATRIB(4).EQ.1,RR1;
          ACT,,ATRIB(4).EQ.2,RR2;
          ACT,,ATRIB(4).EQ.3,RR3;
          ACT,,ATRIB(4).EQ.4,RR4;
          ACT,,ATRIB(4).EQ.5,RR5;
          ACT,,ATRIB(4).EQ.6,RR6;
          ACT,,ATRIB(4).EQ.7,RR7;
          ACT,,ATRIB(4).EQ.8,RR8;
RR1     AWAIT(13),ALLOC(1);
          ACT/3,ATRIB(3);
          FREE,INT/1,1;
          FREE,OP1/1,1;
          FREE,OP2/1,1;
          FREE,OP7/1,1;
          FREE,OP4/1,1;
          FREE,OP5/1,1;
          FREE,OP6/1,1;
          ACT,,,CL1;
RR2     AWAIT(14),ALLOC(2);
          ACT/4,ATRIB(3);
          FREE,INT/1,1;
          FREE,OP1/1,1;
          FREE,OP2/1,1;
          FREE,OP7/1,1;
          FREE,OP5/1,1;
          ACT,,,CL1;
RR3     AWAIT(15),ALLOC(3);
          ACT/5,ATRIB(3);
          FREE,INT/1,1;
          FREE,OP1/1,1;
          FREE,OP2/1,1;
          FREE,OP4/1,1;
          FREE,OP5/1,1;
          ACT,,,CL1;
RR4     AWAIT(16),ALLOC(4);
          ACT/6,ATRIB(3);
          FREE,INT/1,1;
          FREE,OP1/1,1;
          FREE,OP2/1,1;
          FREE,OP7/1,1;
          FREE,OP5/1,1;
          FREE,OP6/1,1;
          ACT,,,CL1;
RR5     AWAIT(17),ALLOC(5);
          ACT/7,ATRIB(3);
          FREE,INT/1,1;
          FREE,OP1/1,1;
          FREE,OP2/1,1;
```

```
          FREE,OP5/1,1;
          FREE,OP6/1,1;
          ACT,,,CL1;
RR6     AWAIT(18),ALLOC(6);
          ACT/8,ATRIB(3);
          FREE,INT/1,1;
          FREE,OP1/1,1;
          FREE,OP2/1,1;
          FREE,OP7/1,1;
          FREE,OP4/1,1;
          FREE,OP5/1,1;
          ACT,,,CL1;
RR7     AWAIT(24),ALLOC(7);
          ACT/10,ATRIB(3);
          FREE,INT/1,1;
          FREE,OP3/1,1;
          FREE,OP7/1,1;
          ACT,,,CL1;
RR8     AWAIT(25),ALLOC(8);
          ACT/11,ATRIB(3);
          FREE,INT/1,1;
          FREE,OP2/1,1;
          FREE,OP7/1,1;
          ACT,,,CL1;
;
CL2       GOON;
          ACT,,ATRIB(4).EQ.7,CON;
          ACT,,ATRIB(4).EQ.8,CON;
          ACT,,,CL1;
;
CL1       COLCT,INT(1),TIS,,1;
          ACT/99;
          TERM;
          END;
;
INIT,0,53200;
INTLC,XX(1)=1440,XX(2)=720,XX(3)=360,XX(4)=240,XX(5)=9.8;
FIN;
```

APPENDIX D

Modification 2/Dispersed 2 DTOC

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GEN,MENGLERT,THESIS,10/28/85,1,NO,YES,YES,YES,YES/1,132;
LIMITS,26,10,10000;
NETWORK;
;
;  TIME IS MINUTES
;
       RESOURCE/NET(1),1;                              O/I FM SEC NET
       RESOURCE/INT(1),13,14,,24,25;                   INTERNAL TOC NET
       RESOURCE/OP1(1),3,9,19;                         CMD CELL RTO
       RESOURCE/OP2(1),3,9,25;                         CRNT OPS RTO
       RESOURCE/OP3(1),19,24;                          CRNT OPS RTO
       RESOURCE/OP4(1),3,9,19;                       CSS       RTO
       RESOURCE/OP5(1),3,9,19;                         PLANS     RTO
       RESOURCE/OP6(1),3,19;                           INTEL     RTO
       RESOURCE/OP7(1),24,25;                          FSE       RTO
;
       CREATE,XX(2),,1,60,1;          INTEL SUM RPT (RATT)
       ASSIGN,ATRIB(2)=9,ATRIB(3)=TRIAG(0.33,0.34,0.36,1),ATRIB(4)=5,1;
         ACT,,,MSG;                DMAIN G2
;
       CREATE,XX(2),,1,60,1;          AD STAT RPT (FM SEC)
       ASSIGN,ATRIB(2)=24,ATRIB(3)=TRIAG(1.45,1.57,1.68,1),ATRIB(4)=8,1;
         ACT,,,OI;                 DMAIN G3
       CREATE,XX(2),,1,60,1;
       ASSIGN,ATRIB(2)=24,ATRIB(3)=TRIAG(1.45,1.57,1.68,1),ATRIB(4)=8,1;
         ACT,,,OI;
       CREATE,XX(2),,1,60,1;
       ASSIGN,ATRIB(2)=24,ATRIB(3)=TRIAG(1.45,1.57,1.68,1),ATRIB(4)=8,1;
         ACT,,,OI;
       CREATE,XX(2),,1,60,1;
       ASSIGN,ATRIB(2)=24,ATRIB(3)=TRIAG(1.45,1.57,1.68,1),ATRIB(4)=8,1;
         ACT,,,OI;
;
       CREATE,XX(3),,1,120,1;           CHEM DNWIND MSG (TTY)
       ASSIGN,ATRIB(2)=27,ATRIB(3)=TRIAG(0.23,0.24,0.26,1),ATRIB(4)=1,1;
         ACT,,,MSG;                DMAIN G3
;
       CREATE,XX(1),,1,30,1;          AVN STAT RPT (FM SEC)
       ASSIGN,ATRIB(2)=57,ATRIB(3)=TRIAG(0.93,1.03,1.13,1),ATRIB(4)=8,1;
         ACT,,,OI;                  DMAIN G3
;
       CREATE,XX(1),,1,30,1;          POW RPT (RATT)
       ASSIGN,ATRIB(2)=66,ATRIB(3)=TRIAG(0.18,0.20,0.22,1),ATRIB(4)=4,1;
         ACT,,,MGS;                 DMAIN G1
       CREATE,XX(1),,1,30,1;
       ASSIGN,ATRIB(2)=66,ATRIB(3)=TRIAG(0.18,0.20,0.22,1),ATRIB(4)=4,1;
         ACT,,,MGS;
       CREATE,XX(1),,1,30,1;
```

```
ASSIGN,ATRIB(2)=66,ATRIB(3)=TRIAG(0.18,0.20,0.22,1),ATRIB(4)=4,1;
  ACT,,,MGS;
CREATE,XX(1),,1,30,1;
ASSIGN,ATRIB(2)=66,ATRIB(3)=TRIAG(0.18,0.20,0.22,1 ,ATRIB(4)=4,1;
  ACT,,,MGS;
CREATE,XX(1),,1,30,1;
ASSIGN,ATRIB(2)=66,ATRIB(3)=TRIAG(0.18,0.20,0.22,1),ATRIB(4)=4,1;
  ACT,,,MGS;
CREATE,XX(1),,1,30,1;
ASSIGN,ATRIB(2)=66,ATRIB(3)=TRIAG(0.18,0.20,0.22,1),ATRIB(4)=4,1;
  ACT,,,MGS;
CREATE,XX(1),,1,30,1;
ASSIGN,ATRIB(2)=66,ATRIB(3)=TRIAG(0.18,0.20,0.22,1),ATRIB(4)=4,1;
  ACT,,,MGS;
CREATE,XX(1),,1,30,1;
ASSIGN,ATRIB(2)=66,ATRIB(3)=TRIAG(0.18,0.20,0.22,1),ATRIB(4)=4,1;
  ACT,,,MGS;
CREATE,XX(1),,1,30,1;
ASSIGN,ATRIB(2)=66,ATRIB(3)=TRIAG(0.18,0.20,0.22,1),ATRIB(4)=4,1;
  ACT,,,MGS;
;
CREATE,XX(1),,1,30,1;          EQUIP WRAPUP RPT (TTY)
ASSIGN,ATRIB(2)=1047,ATRIB(3)=TRIAG(0.07,0.08,0.10,1),ATRIB(4)=2,1;
ACT,,,MGS;                     DMAIN G4
CREATE,XX(1),,1,30,1;          EQUIP WRAPUP RPT (TTY)
ASSIGN,ATRIB(2)=1047,ATRIB(3)=TRIAG(0.07,0.08,0.10,1),ATRIB(4)=2,1;
ACT,,,MGS;                     DMAIN G4
CREATE,XX(1),,1,30,1;          EQUIP WRAPUP RPT (TTY)
ASSIGN,ATRIB(2)=1047,ATRIB(3)=TRIAG(0.07,0.08,0.10,1),ATRIB(4)=2,1;
ACT,,,MGS;                     DMAIN G4
CREATE,XX(1),,1,30,1;          EQUIP WRAPUP RPT (TTY)
ASSIGN,ATRIB(2)=1047,ATRIB(3)=TRIAG(0.07,0.08,0.10,1),ATRIB(4)=2,1;
ACT,,,MGS;                     DMAIN G4
CREATE,XX(1),,1,30,1;          EQUIP WRAPUP RPT (TTY)
ASSIGN,ATRIB(2)=1047,ATRIB(3)=TRIAG(0.07,0.08,0.10,1),ATRIB(4)=2,1;
ACT,,,MGS;                     DMAIN G4
CREATE,XX(1),,1,30,1;          EQUIP WRAPUP RPT (TTY)
ASSIGN,ATRIB(2)=1047,ATRIB(3)=TRIAG(0.07,0.08,0.10,1),ATRIB(4)=2,1;
ACT,,,MGS;                     DMAIN G4
CREATE,XX(1),,1,30,1;          EQUIP WRAPUP RPT (TTY)
ASSIGN,ATRIB(2)=1047,ATRIB(3)=TRIAG(0.07,0.08,0.10,1),ATRIB(4)=2,1;
ACT,,,MGS;                     DMAIN G4
CREATE,XX(1),,1,30,1;          EQUIP WRAPUP RPT (TTY)
ASSIGN,ATRIB(2)=1047,ATRIB(3)=TRIAG(0.07,0.08,0.10,1),ATRIB(4)=2,1;
ACT,,,MGS;                     DMAIN G4
CREATE,XX(1),,1,30,1;          EQUIP WRAPUP RPT (TTY)
ASSIGN,ATRIB(2)=1047,ATRIB(3)=TRIAG(0.07,0.08,0.10,1),ATRIB(4)=2,1;
ACT,,,MGS;                     DMAIN G4
;
CREATE,XX(1),,1,30,1;          ENGR ASSES RPT (FM SEC)
ASSIGN,ATRIB(2)=1041,ATRIB(3)=TRIAG(1.22,1.32,1.42,1),ATRIB(4)=9,1;
ACT,,,OI;                      DMAIN G3
;
CREATE,XX(1),,1,30,1;           DS MAINT RPT (TTY)
ASSIGN,ATRIB(2)=1035,ATRIB(3)=TRIAG(0.21,0.23,0.24,1),ATRIB(4)=2,1;
```

```
ACT,,,MGS;                    DMAIN G4
CREATE,XX(1),,1,30,1;
ASSIGN,ATRIB(2)=1035,ATRIB(3)=TRIAG(0.21,0.23,0.24,1),ATRIB(4)=2,1;
ACT,,,MGS;                    DMAIN G4
CREATE,XX(1),,1,30,1;
ASSIGN,ATRIB(2)=1035,ATRIB(3)=TRIAG(0.21,0.23,0.24,1),ATRIB(4)=2,1;
ACT,,,MGS;                    DMAIN G4
CREATE,XX(1),,1,30,1;
ASSIGN,ATRIB(2)=1035,ATRIB(3)=TRIAG(0.21,0.23,0.24,1),ATRIB(4)=2,1;
ACT,,,MGS;                    DMAIN G4
;
CREATE,XX(4),,1,180,1;             UNIT LOC RPT (FM SEC)
ASSIGN,ATRIB(2)=126,ATRIB(3)=TRIAG(0.82,0.92,1.02,1),ATRIB(4)=8,1;
ACT,,,OI;                     DMAIN G3
CREATE,XX(4),,1,180,1;             UNIT LOC RPT (FM SEC)
ASSIGN,ATRIB(2)=126,ATRIB(3)=TRIAG(0.82,0.92,1.02,1),ATRIB(4)=8,1;
ACT,,,OI;                     DMAIN G3
CREATE,XX(4),,1,180,1;             UNIT LOC RPT (FM SEC)
ASSIGN,ATRIB(2)=126,ATRIB(3)=TRIAG(0.82,0.92,1.02,1),ATRIB(4)=8,1;
ACT,,,OI;                     DMAIN G3
CREATE,XX(4),,1,180,1;             UNIT LOC RPT (FM SEC)
ASSIGN,ATRIB(2)=126,ATRIB(3)=TRIAG(0.82,0.92,1.02,1),ATRIB(4)=8,1;
ACT,,,OI;                     DMAIN G3
CREATE,XX(4),,1,180,1;             UNIT LOC RPT (FM SEC)
ASSIGN,ATRIB(2)=126,ATRIB(3)=TRIAG(0.82,0.92,1.02,1),ATRIB(4)=8,1;
ACT,,,OI;                     DMAIN G3
CREATE,XX(4),,1,180,1;             UNIT LOC RPT (FM SEC)
ASSIGN,ATRIB(2)=126,ATRIB(3)=TRIAG(0.82,0.92,1.02,1),ATRIB(4)=8,1;
ACT,,,OI;                     DMAIN G3
CREATE,XX(4),,1,180,1;             UNIT LOC RPT (FM SEC)
ASSIGN,ATRIB(2)=126,ATRIB(3)=TRIAG(0.82,0.92,1.02,1),ATRIB(4)=8,1;
ACT,,,OI;                     DMAIN G3
CREATE,XX(4),,1,180,1;             UNIT LOC RPT (FM SEC)
ASSIGN,ATRIB(2)=126,ATRIB(3)=TRIAG(0.82,0.92,1.02,1),ATRIB(4)=8,1;
ACT,,,OI;                     DMAIN G3
CREATE,XX(4),,1,180,1;             UNIT LOC RPT (FM SEC)
ASSIGN,ATRIB(2)=126,ATRIB(3)=TRIAG(0.82,0.92,1.02,1),ATRIB(4)=8,1;
ACT,,,OI;                     DMAIN G3
;
CREATE,XX(1),,1,30,1;            NBC DEF CO STAT RPT (TTY)
ASSIGN,ATRIB(2)=1067,ATRIB(3)=TRIAG(0.25,0.27,0.28,1),ATRIB(4)=9,1;
ACT,,,OI;                     DMAIN G3
;
CREATE,XX(2),,1,60,1;             CNTR FIRE STAT RPT (FM SEC)
ASSIGN,ATRIB(2)=1031,ATRIB(3)=TRIAG(0.58,0.68,0.78,1),ATRIB(4)=8,1;
ACT,,,OI;                     DMAIN G3
CREATE,XX(2),,1,60,1;             CNTR FIRE STAT RPT (FM SEC)
ASSIGN,ATRIB(2)=1031,ATRIB(3)=TRIAG(0.58,0.68,0.78,1),ATRIB(4)=8,1;
ACT,,,OI;                     DMAIN G3
CREATE,XX(2),,1,60,1;             CNTR FIRE STAT RPT (FM SEC)
ASSIGN,ATRIB(2)=1031,ATRIB(3)=TRIAG(0.58,0.68,0.78,1),ATRIB(4)=8,1;
ACT,,,OI;                     DMAIN G3
CREATE,XX(2),,1,60,1;             CNTR FIRE STAT RPT (FM SEC)
ASSIGN,ATRIB(2)=1031,ATRIB(3)=TRIAG(0.58,0.68,0.78,1),ATRIB(4)=8,1;
ACT,,,OI;                     DMAIN G3
```

```
CREATE,XX(2),,1,60,1;             CNTR FIRE STAT RPT (FM SEC)
ASSIGN,ATRIB(2)=1031,ATRIB(3)=TRIAG(0.58,0.68,0.78,1),ATRIB(4)=8,1;
ACT,,,OI;                    DMAIN G3
CREATE,XX(2),,1,60,1;             CNTR FIRE STAT RPT (FM SEC)
ASSIGN,ATRIB(2)=1031,ATRIB(3)=TRIAG(0.58,0.68,0.78,1),ATRIB(4)=8,1;
ACT,,,OI;                    DMAIN G3
CREATE,XX(2),,1,60,1;             CNTR FIRE STAT RPT (FM SEC)
ASSIGN,ATRIB(2)=1031,ATRIB(3)=TRIAG(0.58,0.68,0.78,1),ATRIB(4)=8,1;
ACT,,,OI;                    DMAIN G3
CREATE,XX(2),,1,60,1;             CNTR FIRE STAT RPT (FM SEC)
ASSIGN,ATRIB(2)=1031,ATRIB(3)=TRIAG(0.58,0.68,0.78,1),ATRIB(4)=8,1;
ACT,,,OI;                    DMAIN G3
CREATE,XX(2),,1,60,1;             CNTR FIRE STAT RPT (FM SEC)
ASSIGN,ATRIB(2)=1031,ATRIB(3)=TRIAG(0.58,0.68,0.78,1),ATRIB(4)=8,1;
ACT,,,OI;                    DMAIN G3
;
CREATE,XX(1),,1,30,1;            CLASS 5 RPT (TTY)
ASSIGN,ATRIB(2)=1025,ATRIB(3)=TRIAG(0.14,0.16,0.18,1),ATRIB(4)=6,1;
ACT,,,MGS;                   DMAIN G4
;
CREATE,XX(1),,1,30,1;            EW STAT RPT (TTY)
ASSIGN,ATRIB(2)=116,ATRIB(3)=TRIAG(0.08,0.10,0.12,1),ATRIB(4)=4,1;
ACT,,,MSG;                   DMAIN G2
CREATE,XX(1),,1,30,1;            EW STAT RPT (TTY)
ASSIGN,ATRIB(2)=116,ATRIB(3)=TRIAG(0.08,0.10,0.12,1),ATRIB(4)=4,1;
ACT,,,MSG;                   DMAIN G2
CREATE,XX(1),,1,30,1;            EW STAT RPT (TTY)
ASSIGN,ATRIB(2)=116,ATRIB(3)=TRIAG(0.08,0.10,0.12,1),ATRIB(4)=4,1;
ACT,,,MSG;                   DMAIN G2
;
CREATE,XX(1),,1,30,1;            PERS SIT RPT (TTY)
ASSIGN,ATRIB(2)=104,ATRIB(3)=TRIAG(0.48,0.49,0.51,1),ATRIB(4)=2,1;
ACT,,,MGS;                   DMAIN G1
CREATE,XX(1),,1,30,1;            PERS SIT RPT (TTY)
ASSIGN,ATRIB(2)=104,ATRIB(3)=TRIAG(0.48,0.49,0.51,1),ATRIB(4)=2,1;
ACT,,,MGS;                   DMAIN G1
CREATE,XX(1),,1,30,1;            PERS SIT RPT (TTY)
ASSIGN,ATRIB(2)=104,ATRIB(3)=TRIAG(0.48,0.49,0.51,1),ATRIB(4)=2,1;
ACT,,,MGS;                   DMAIN G1
CREATE,XX(1),,1,30,1;            PERS SIT RPT (TTY)
ASSIGN,ATRIB(2)=104,ATRIB(3)=TRIAG(0.48,0.49,0.51,1),ATRIB(4)=2,1;
ACT,,,MGS;                   DMAIN G1
CREATE,XX(1),,1,30,1;            PERS SIT RPT (TTY)
ASSIGN,ATRIB(2)=104,ATRIB(3)=TRIAG(0.48,0.49,0.51,1),ATRIB(4)=2,1;
ACT,,,MGS;                   DMAIN G1
CREATE,XX(1),,1,30,1;            PERS SIT RPT (TTY)
ASSIGN,ATRIB(2)=104,ATRIB(3)=TRIAG(0.48,0.49,0.51,1),ATRIB(4)=2,1;
ACT,,,MGS;                   DMAIN G1
CREATE,XX(1),,1,30,1;            PERS SIT RPT (TTY)
ASSIGN,ATRIB(2)=104,ATRIB(3)=TRIAG(0.48,0.49,0.51,1),ATRIB(4)=2,1;
ACT,,,MGS;                   DMAIN G1
CREATE,XX(1),,1,30,1;            PERS SIT RPT (TTY)
ASSIGN,ATRIB(2)=104,ATRIB(3)=TRIAG(0.48,0.49,0.51,1),ATRIB(4)=2,1;
ACT,,,MGS;                   DMAIN G1
CREATE,XX(1),,1,30,1;            PERS SIT RPT (TTY)
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ASSIGN,ATRIB(2)=104,ATRIB(3)=TRIAG(0.48,0.49,0.51,1),ATRIB(4)=2,1;
ACT,,,MGS;                  DMAIN G1
;
CREATE,XX(3),,1,120,1;              NBC WTHR/WIND RPT (TTY)
ASSIGN,ATRIB(2)=80,ATRIB(3)=TRIAG(0.07,0.08,0.10,1),ATRIB(4)=1,1;
ACT,,,MSG;                  DMAIN G3
;
CREATE,XX(3),,1,120,1;              CDRS SIT RPT (FM SEC)
ASSIGN,ATRIB(2)=59,ATRIB(3)=TRIAG(1.48,1.60,1.72,1),ATRIB(4)=8,1;
ACT,,,OI;                   DMAIN G3
CREATE,XX(3),,1,120,1;              CDRS SIT RPT (FM SEC)
ASSIGN,ATRIB(2)=59,ATRIB(3)=TRIAG(1.48,1.60,1.72,1),ATRIB(4)=8,1;
ACT,,,OI;                   DMAIN G3
CREATE,XX(3),,1,120,1;              CDRS SIT RPT (FM SEC)
ASSIGN,ATRIB(2)=59,ATRIB(3)=TRIAG(1.48,1.60,1.72,1),ATRIB(4)=8,1:
ACT,,,OI;                   DMAIN G3
CREATE,XX(3),,1,120,1;              CDRS SIT RPT (FM SEC)
ASSIGN,ATRIB(2)=59,ATRIB(3)=TRIAG(1.48,1.60,1.72,1),ATRIB(4)=8,1;
ACT,,,OI;                   DMAIN G3
CREATE,XX(3),,1,120,1;              CDRS SIT RPT (FM SEC)
ASSIGN,ATRIB(2)=59,ATRIB(3)=TRIAG(1.48,1.60,1.72,1),ATRIB(4)=8,1;
ACT,,,OI;                   DMAIN G3
CREATE,XX(3),,1,120,1;              CDRS SIT RPT (FM SEC)
ASSIGN,ATRIB(2)=59,ATRIB(3)=TRIAG(1.48,1.60,1.72,1),ATRIB(4)=8,1;
ACT,,,OI;                   DMAIN G3
CREATE,XX(3),,1,120,1;              CDRS SIT RPT (FM SEC)
ASSIGN,ATRIB(2)=59,ATRIB(3)=TRIAG(1.48,1.60,1.72,1),ATRIB(4)=8,1;
ACT,,,OI;                   DMAIN G3
CREATE,XX(3),,1,120,1;              CDRS SIT RPT (FM SEC)
ASSIGN,ATRIB(2)=59,ATRIB(3)=TRIAG(1.48,1.60,1.72,1),ATRIB(4)=8,1;
ACT,,,OI;                   DMAIN G3
CREATE,XX(3),,1,120,1;              CDRS SIT RPT (FM SEC)
ASSIGN,ATRIB(2)=59,ATRIB(3)=TRIAG(1.48,1.60,1.72,1),ATRIB(4)=8,1;
ACT,,,OI;                   DMAIN G3
;
CREATE,XX(2),,1,60,1;             ARTY SIT RPT (RATT)
ASSIGN,ATRIB(2)=35,ATRIB(3)=TRIAG(0.13,0.15,0.17,1),ATRIB(4)=3,1;
ACT,,,MSG:                  DMAIN G3
;
CREATE,XX(1),,1,30,1;             ECM SUM RPT (TTY)
ASSIGN,ATRIB(2)=32,ATRIB(3)=TRIAG(0.09,0.11,0.13,1),ATRIB(4)=5,1;
ACT,,,MSG;                  DMAIN G3
CREATE,XX(1),,1,30,1;             ECM SUM RPT (TTY)
ASSIGN,ATRIB(2)=32,ATRIB(3)=TRIAG(0.09,0.11,0.13,1),ATRIB(4)=5,1;
ACT,,,MSG;                  DMAIN G3
CREATE,XX(1),,1,30,1;             ECM SUM RPT (TTY)
ASSIGN,ATRIB(2)=32,ATRIB(3)=TRIAG(0.09,0.11,0.13,1),ATRIB(4)=5,1;
ACT,,,MSG;                  DMAIN G3
CREATE,XX(1),,1,30,1;             ECM SUM RPT (TTY)
ASSIGN,ATRIB(2)=32,ATRIB(3)=TRIAG(0.09,0.11,0.13,1),ATRIB(4)=5,1;
ACT,,,MSG;                  DMAIN G3
CREATE,XX(1),,1,30,1;             ECM SUM RPT (TTY)
ASSIGN,ATRIB(2)=32,ATRIB(3)=TRIAG(0.09,0.11,0.13,1),ATRIB(4)=5,1;
ACT,,,MSG;                  DMAIN G3
CREATE,XX(1),,1,30,1;             ECM SUM RPT (TTY)
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      ASSIGN,ATRIB(2)=32,ATRIB(3)=TRIAG(0.09,0.11,0.13,1),ATRIB(4)=5,1;
      ACT,,,MSG;                        DMAIN G3
      CREATE,XX(1),,1,30,1;                 ECM SUM RPT (TTY)
      ASSIGN,ATRIB(2)=32,ATRIB(3)=TRIAG(0.09,0.11,0.13,1),ATRIB(4)=5,1;
      ACT,,,MSG;                        DMAIN G3
      CREATE,XX(1),,1,30,1;                 ECM SUM RPT (TTY)
      ASSIGN,ATRIB(2)=32,ATRIB(3)=TRIAG(0.09,0.11,0.13,1),ATRIB(4)=5,1;
      ACT,,,MSG;                        DMAIN G3
      CREATE,XX(1),,1,30,1;                 ECM SUM RPT (TTY)
      ASSIGN,ATRIB(2)=32,ATRIB(3)=TRIAG(0.09,0.11,0.13,1),ATRIB(4)=5,1;
      ACT,,,MSG;                        DMAIN G3
;
      CREATE,XX(1),,1,30,1;                 LOSS RPT (TTY)
      ASSIGN,ATRIB(2)=61,ATRIB(3)=TRIAG(0.07,0.08,0.10,1),ATRIB(4)=2,1;
      ACT,,,MGS;                        DMAIN G4
;
      CREATE,XX(1),,1,30,1;                 AIR RQST (TTY)
      ASSIGN,ATRIB(2)=55,ATRIB(3)=TRIAG(0.32,0.33,0.35,1),ATRIB(4)=3,1;
      ACT,,,MSG;                        DMAIN G3
      CREATE,XX(1),,1,30,1;                 AIR RQST (TTY)
      ASSIGN,ATRIB(2)=55,ATRIB(3)=TRIAG(0.32,0.33,0.35,1),ATRIB(4)=3,1;
      ACT,,,MSG;                        DMAIN G3
      CREATE,XX(1),,1,30,1;                 AIR RQST (TTY)
      ASSIGN,ATRIB(2)=55,ATRIB(3)=TRIAG(0.32,0.33,0.35,1),ATRIB(4)=3,1;
      ACT,,,MSG;                        DMAIN G3
      CREATE,XX(1),,1,30,1;                 AIR RQST (TTY)
      ASSIGN,ATRIB(2)=55,ATRIB(3)=TRIAG(0.32,0.33,0.35,1),ATRIB(4)=3,1;
      ACT,,,MSG;                        DMAIN G3
      CREATE,XX(1),,1,30,1;                 AIR RQST (TTY)
      ASSIGN,ATRIB(2)=55,ATRIB(3)=TRIAG(0.32,0.33,0.35,1),ATRIB(4)=3,1;
      ACT,,,MSG;                        DMAIN G3
      CREATE,XX(1),,1,30,1;                 AIR RQST (TTY)
      ASSIGN,ATRIB(2)=55,ATRIB(3)=TRIAG(0.32,0.33,0.35,1),ATRIB(4)=3,1;
      ACT,,,MSG;                        DMAIN G3
      CREATE,XX(1),,1,30,1;                 AIR RQST (TTY)
      ASSIGN,ATRIB(2)=55,ATRIB(3)=TRIAG(0.32,0.33,0.35,1),ATRIB(4)=3,1;
      ACT,,,MSG;                        DMAIN G3
      CREATE,XX(1),,1,30,1;                 AIR RQST (TTY)
      ASSIGN,ATRIB(2)=55,ATRIB(3)=TRIAG(0.32,0.33,0.35,1),ATRIB(4)=3,1;
      ACT,,,MSG;                        DMAIN G3
      CREATE,XX(1),,1,30,1;                 AIR RQST (TTY)
      ASSIGN,ATRIB(2)=55,ATRIB(3)=TRIAG(0.32,0.33,0.35,1),ATRIB(4)=3,1;
      ACT,,,MSG;                        DMAIN G3
;
      CREATE,XX(1),,1,30,1;                 PERS RQMT RPT (TTY)
      ASSIGN,ATRIB(2)=19,ATRIB(3)=TRIAG(0.18,0.20,0.22,1),ATRIB(4)=2,1;
      ACT,,,MGS;                        DMAIN G1
      CREATE,XX(1),,1,30,1;                 PERS RQMT RPT (TTY)
      ASSIGN,ATRIB(2)=19,ATRIB(3)=TRIAG(0.18,0.20,0.22,1),ATRIB(4)=2,1;
      ACT,,,MGS;                        DMAIN G1
      CREATE,XX(1),,1,30,1;                 PERS RQMT RPT (TTY)
      ASSIGN,ATRIB(2)=19,ATRIB(3)=TRIAG(0.18,0.20,0.22,1),ATRIB(4)=2,1;
      ACT,,,MGS;                        DMAIN G1
      CREATE,XX(1),,1,30,1;                 PERS RQMT RPT (TTY)
      ASSIGN,ATRIB(2)=19,ATRIB(3)=TRIAG(0.18,0.20,0.22,1),ATRIB(4)=2,1;
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ACT,,,MGS;                    DMAIN G1
CREATE,XX(1),,1,30,1;            PERS RQMT RPT (TTY)
ASSIGN,ATRIB(2)=19,ATRIB(3)=TRIAG(0.18,0.20,0.22,1),ATRIB(4)=2,1;
ACT,,,MGS;                    DMAIN G1
CREATE,XX(1),,1,30,1;            PERS RQMT RPT (TTY)
ASSIGN,ATRIB(2)=19,ATRIB(3)=TRIAG(0.18,0.20,0.22,1),ATRIB(4)=2,1;
ACT,,,MGS;                    DMAIN G1
CREATE,XX(1),,1,30,1;            PERS RQMT RPT (TTY)
ASSIGN,ATRIB(2)=19,ATRIB(3)=TRIAG(0.18,0.20,0.22,1),ATRIB(4)=2,1;
ACT,,,MGS;                    DMAIN G1
CREATE,XX(1),,1,30,1;            PERS RQMT RPT (TTY)
ASSIGN,ATRIB(2)=19,ATRIB(3)=TRIAG(0.18,0.20,0.22,1),ATRIB(4)=2,1;
ACT,,,MGS;                    DMAIN G1
CREATE,XX(1),,1,30,1;            PERS RQMT RPT (TTY)
ASSIGN,ATRIB(2)=19,ATRIB(3)=TRIAG(0.18,0.20,0.22,1),ATRIB(4)=2,1;
ACT,,,MGS;                    DMAIN G1
;
CREATE,XX(3),,1,120,1;              WTR PT STAT RPT (FM SEC)
ASSIGN,ATRIB(2)=1100,ATRIB(3)=TRIAG(0.62,0.72,0.82,1),ATRIB(4)=9,1;
ACT,,,OI;                     DMAIN G4
CREATE,XX(3),,1,120,1;              WTR PT STAT RPT (FM SEC)
ASSIGN,ATRIB(2)=1100,ATRIB(3)=TRIAG(0.62,0.72,0.82,1),ATRIB(4)=9,1;
ACT,,,OI;                     DMAIN G4
CREATE,XX(3),,1,120,1;              WTR PT STAT RPT (FM SEC)
ASSIGN,ATRIB(2)=1100,ATRIB(3)=TRIAG(0.62,0.72,0.82,1),ATRIB(4)=9,1;
ACT,,,OI;                     DMAIN G4
CREATE,XX(3),,1,120,1;              WTR PT STAT RPT (FM SEC)
ASSIGN,ATRIB(2)=1100,ATRIB(3)=TRIAG(0.62,0.72,0.82,1),ATRIB(4)=9,1;
ACT,,,OI;                     DMAIN G4
CREATE,XX(3),,1,120,1;              WTR PT STAT RPT (FM SEC)
ASSIGN,ATRIB(2)=1100,ATRIB(3)=TRIAG(0.62,0.72,0.82,1),ATRIB(4)=9,1;
ACT,,,OI;                     DMAIN G4
CREATE,XX(3),,1,120,1;              WTR PT STAT RPT (FM SEC)
ASSIGN,ATRIB(2)=1100,ATRIB(3)=TRIAG(0.62,0.72,0.82,1),ATRIB(4)=9,1;
ACT,,,OI;                     DMAIN G4
CREATE,XX(3),,1,120,1;              WTR PT STAT RPT (FM SEC)
ASSIGN,ATRIB(2)=1100,ATRIB(3)=TRIAG(0.62,0.72,0.82,1),ATRIB(4)=9,1;
ACT,,,OI;                     DMAIN G4
CREATE,XX(3),,1,120,1;              WTR PT STAT RPT (FM SEC)
ASSIGN,ATRIB(2)=1100,ATRIB(3)=TRIAG(0.62,0.72,0.82,1),ATRIB(4)=9,1;
ACT,,,OI;                     DMAIN G4
CREATE,XX(3),,1,120,1;              WTR PT STAT RPT (FM SEC)
ASSIGN,ATRIB(2)=1100,ATRIB(3)=TRIAG(0.62,0.72,0.82,1),ATRIB(4)=9,1;
ACT,,,OI;                     DMAIN G4
;
CREATE,XX(3),,1,120,1;              SIT UPDT RPT (RATT)
ASSIGN,ATRIB(2)=1091,ATRIB(3)=TRIAG(0.17,0.18,0.20,1),ATRIB(4)=1,1;
ACT,,,MSG;                    DMAIN G3
CREATE,XX(3),,1,120,1;              SIT UPDT RPT (RATT)
ASSIGN,ATRIB(2)=1091,ATRIB(3)=TRIAG(0.17,0.18,0.20,1),ATRIB(4)=1,1;
ACT,,,MSG;                    DMAIN G3
CREATE,XX(3),,1,120,1;              SIT UPDT RPT (RATT)
ASSIGN,ATRIB(2)=1091,ATRIB(3)=TRIAG(0.17,0.18,0.20,1),ATRIB(4)=1,1;
ACT,,,MSG;                    DMAIN G3
CREATE,XX(3),,1,120,1;              SIT UPDT RPT (RATT)
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ASSIGN,ATRIB(2)=1091,ATRIB(3)=TRIAG(0.17,0.18,0.20,1),ATRIB(4)=1,1;
ACT,,,MSG;                     DMAIN G3
CREATE,XX(3),,1,120,1;              SIT UPDT RPT (RATT)
ASSIGN,ATRIB(2)=1091,ATRIB(3)=TRIAG(0.17,0.18,0.20,1),ATRIB(4)=1,1;
ACT,,,MSG;                     DMAIN G3
CREATE,XX(3),,1,120,1;              SIT UPDT RPT (RATT)
ASSIGN,ATRIB(2)=1091,ATRIB(3)=TRIAG(0.17,0.18,0.20,1),ATRIB(4)=1,1;
ACT,,,MSG;                     DMAIN G3
CREATE,XX(3),,1,120,1;              SIT UPDT RPT (RATT)
ASSIGN,ATRIB(2)=1091,ATRIB(3)=TRIAG(0.17,0.18,0.20,1),ATRIB(4)=1,1;
ACT,,,MSG;                     DMAIN G3
CREATE,XX(3),,1,120,1;              SIT UPDT RPT (RATT)
ASSIGN,ATRIB(2)=1091,ATRIB(3)=TRIAG(0.17,0.18,0.20,1),ATRIB(4)=1,1;
ACT,,,MSG;                     DMAIN G3
CREATE,XX(3),,1,120,1;              SIT UPDT RPT (RATT)
ASSIGN,ATRIB(2)=1091,ATRIB(3)=TRIAG(0.17,0.18,0.20,1),ATRIB(4)=1,1;
ACT,,,MSG;                     DMAIN G3
;
CREATE,XX(1),,1,30,1;             RAD STAT RPT (FM SEC)
ASSIGN,ATRIB(2)=1081,ATRIB(3)=TRIAG(0.72,0.82,0.92,1),ATRIB(4)=7,1;
ACT,,,OI;                      DMAIN G2
CREATE,XX(1),,1,30,1;             RAD STAT RPT (FM SEC)
ASSIGN,ATRIB(2)=1081,ATRIB(3)=TRIAG(0.72,0.82,0.92,1),ATRIB(4)=7,1;
ACT,,,OI;                      DMAIN G2
CREATE,XX(1),,1,30,1;             RAD STAT RPT (FM SEC)
ASSIGN,ATRIB(2)=1081,ATRIB(3)=TRIAG(0.72,0.82,0.92,1),ATRIB(4)=7,1;
ACT,,,OI;                      DMAIN G2
CREATE,XX(1),,1,30,1;             RAD STAT RPT (FM SEC)
ASSIGN,ATRIB(2)=1081,ATRIB(3)=TRIAG(0.72,0.82,0.92,1),ATRIB(4)=7,1;
ACT,,,OI;                      DMAIN G2
CREATE,XX(1),,1,30,1;             RAD STAT RPT (FM SEC)
ASSIGN,ATRIB(2)=1081,ATRIB(3)=TRIAG(0.72,0.82,0.92,1),ATRIB(4)=7,1;
ACT,,,OI;                      DMAIN G2
CREATE,XX(1),,1,30,1;             RAD STAT RPT (FM SEC)
ASSIGN,ATRIB(2)=1081,ATRIB(3)=TRIAG(0.72,0.82,0.92,1),ATRIB(4)=7,1;
ACT,,,OI;                      DMAIN G2
CREATE,XX(1),,1,30,1;             RAD STAT RPT (FM SEC)
ASSIGN,ATRIB(2)=1081,ATRIB(3)=TRIAG(0.72,0.82,0.92,1),ATRIB(4)=7,1;
ACT,,,OI;                      DMAIN G2
CREATE,XX(1),,1,30,1;             RAD STAT RPT (FM SEC)
ASSIGN,ATRIB(2)=1081,ATRIB(3)=TRIAG(0.72,0.82,0.92,1),ATRIB(4)=7,1;
ACT,,,OI;                      DMAIN G2
CREATE,XX(1),,1,30,1;             RAD STAT RPT (FM SEC)
ASSIGN,ATRIB(2)=1081,ATRIB(3)=TRIAG(0.72,0.82,0.92,1),ATRIB(4)=7,1;
ACT,,,OI;                      DMAIN G2
;
CREATE,XX(1),,1,30,1;             COMSEC STAT RPT (RATT)
ASSIGN,ATRIB(2)=1030,ATRIB(3)=TRIAG(0.09,0.11,0.13,1),ATRIB(4)=1,1;
ACT,,,MSG;                     DMAIN G2
;
CREATE,XX(2),,1,60,1;              CLASS 3 RPT (TTY)
ASSIGN,ATRIB(2)=1024,ATRIB(3)=TRIAG(0.16,0.18,0.19,1),ATRIB(4)=2,1;
ACT,,,MGS;                     DMAIN G4
;
CREATE,XX(2),,1,60,1;              ARTY SIT RPT (RATT)
```

```
        ASSIGN,ATRIB(2)=1013,ATRIB(3)=TRIAG(0.17,0.18,0.20,1),ATRIB(4)=1,1;
        ACT,,,MSG;                      DMAIN G3
;
        CREATE,XX(1),,1,30,1;              ENGR SIT RPT (TTY)
        ASSIGN,ATRIB(2)=115,ATRIB(3)=TRIAG(0.83,0.87,0.90,1),ATRIB(4)=2,1;
        ACT,,,MSG;                      DMAIN G3
;
OI      AWAIT(1),NET/1,,1;
          ACT/44,,ATRIB(4).EQ.9,R4;
          ACT/55,,ATRIB(4).EQ.7,R2;
          ACT/66,,ATRIB(4).EQ.8,R6;
          ACT/100;
          TERM;
R6      AWAIT(3),ALLOC(9);
          ACT/1,ATRIB(3);
        FREE,NET/1,1;
        FREE,OP1/1,1;
        FREE,OP2/1,1;
        FREE,OP4/1,1;
        FREE,OP5/1,1;
        FREE,OP6/1,1;
        ACT,,,CL2;
R4      AWAIT(9),ALLOC(10);
          ACT/2,ATRIB(3);
        FREE,NET/1,1;
        FREE,OP1/1,1;
        FREE,OP2/1,1;
        FREE,OP4/1,1;
        FREE,OP5/1,1;
        ACT,,,CL2;
R2      AWAIT(19),ALLOC(11);
          ACT/1,ATRIB(3);
        FREE,NET/1,1;
        FREE,OP1/1,1;
        FREE,OP3/1,1;
        FREE,OP4/1,1;
        FREE,OP5/1,1;
        FREE,OP6/1,1;
        ACT,,,CL2;
;
MGS     GOON;
        AWAIT(13),INT/1,,1;
        ACT/3,ATRIB(3);
        FREE,INT/1,1;
        ACT,,,CL1;
;
MSG     GOON;
        AWAIT(14),INT/1,,1;
        ACT/4,ATRIB(3);
        FREE,INT/1,1;
        ACT,,,CL1;
;
CON     GOON;
          ACT,,ATRIB(4).EQ.7,RR7;
          ACT,,ATRIB(4).EQ.8,RR8;
```

```
RR7     AWAIT(24),ALLOC(7);
          ACT/10,ATRIB(3);
          FREE,INT/1,1;
          FREE,OP3/1,1;
          FREE,OP7/1,1;
          ACT,,,CL1;
RR8     AWAIT(25),ALLOC(8);
          ACT/11,ATRIB(3);
          FREE,INT/1,1;
          FREE,OP2/1,1;
          FREE,OP7/1,1;
          ACT,,,CL1;
;
CL2       GOON;
          ACT,,ATRIB(4).EO.7,CON;
          ACT,,ATRIB(4).EQ.8,CON;
          ACT,,,CL1;
;
CL1       COLCT,INT(1),TIS,,1;
          ACT/99;
          TERM;
          END;
;
INIT,0,53200;
INTLC,XX(1)=1440,XX(2)=720,XX(3)=360,XX(4)=240,XX(5)=9.8;
FIN;
```

APPENDIX E

FORTRAN Code for SLAM

```
      PROGRAM MAIN
      DIMENSION NSET(1000000)
      COMMON/SCOM1/ATRIB(100),DD(100),DDL(100),DTNOW,II,MFA,MSTOP,NCLNR
     1,NCRDR,NPRNT,NNRUN,NNSET,NTAPE,SS(100),SSL(100),TNEXT,TNOW,XX(100)
      COMMON QSET(1000000)
      EQUIVALENCE(NSET(1),QSET(1))
      NNSET=1000000
      NCRDR=5
      NPRNT=6
      NTAPE=7
      NPLOT=2
      CALL SLAM
      STOP
      END
      SUBROUTINE EVENT(I)
      COMMON/SCOM1/ATRIB(100),DD(100),DDL(100),DTNOW,II,MFA,MSTOP,NCLNR
     1,NCRDR,NPRNT,NNRUN,NNSET,NTAPE,SS(100),SSL(100),TNEXT,TNOW,XX(100)
10    RETURN
      END
      SUBROUTINE INTLC
      COMMON/SCOM1/ATRIB(100),DD(100),DDL(100),DTNOW,II,MFA,MSTOP,NCLNR
     1,NCRDR,NPRNT,NNRUN,NNSET,NTAPE,SS(100),SSL(100),TNEXT,TNOW,XX(100)
      RETURN
      END
      SUBROUTINE OTPUT
      COMMON/SCOM1/ATRIB(100),DD(100),DDL(100),DTNOW,II,MFA,MSTOP,NCLNR
     1,NCRDR,NPRNT,NNRUN,NNSET,NTAPE,SS(100),SSL(100),TNEXT,TNOW,XX(100)
      RETURN
      END
      SUBROUTINE ALLOC(I,IFLAG)
      COMMON/SCOM1/ATRIB(100),DD(100),DDL(100),DTNOW,II,MFA,MSTOP,NCLNR
     1,NCRDR,NPRNT,NNRUN,NNSET,NTAPE,SS(100),SSL(100),TNEXT,TNOW,XX(100)
      IFLAG=0
      GO TO (1,2,3,4,5,6,7,8,9,10,11),I
C
C     RULE 1-SEIZE RESOURCES 2,3,4,9,6,7,8
C
    1 IF (NNRSC(2).LE.0.OR.NNRSC(3).LE.0.OR.NNRSC(4).LE.0.OR.NNRSC(6)
     1.LE.0.OR.NNRSC(7).LE.0.OR.NNRSC(8).LE.0.OR.NNRSC(9).LE.0)RETURN
      CALL SEIZE(2,1)
      CALL SEIZE(3,1)
      CALL SEIZE(4,1)
      CALL SEIZE(6,1)
      CALL SEIZE(7,1)
      CALL SEIZE(8,1)
      CALL SEIZE(9,1)
```

```
      IFLAG= -1
      RETURN
C
C     RULE 2- SEIZE RESOURCES 2,3,4,9 AND 7
C
    2 IF (NNRSC(2).LE.0.OR.NNRSC(3).LE.0.OR.NNRSC(4).LE.0.OR.NNRSC(7)
     1.LE.0.OR.NNRSC(9).LE.0)RETURN
      CALL SEIZE(2,1)
      CALL SEIZE(3,1)
      CALL SEIZE(4,1)
      CALL SEIZE(7,1)
      CALL SEIZE(9,1)
      IFLAG= -1
      RETURN
C
C     RULE 3- SEIZE RESOURCES 2,3,4,6 AND 7
C
    3 IF (NNRSC(2).LE.0.OR.NNRSC(3).LE.0.OR.NNRSC(4).LE.0.OR.NNRSC(6)
     1.LE.0.OR.NNRSC(7).LE.0)RETURN
      CALL SEIZE(2,1)
      CALL SEIZE(3,1)
      CALL SEIZE(4,1)
      CALL SEIZE(6,1)
      CALL SEIZE(7,1)
      IFLAG= -1
      RETURN
C
C     RULE 4- SEIZE RESOURCES 2,3,4,9,7 AND 8
C
    4 IF (NNRSC(2).LE.0.OR.NNRSC(3).LE.0.OR.NNRSC(4).LE.0.OR.NNRSC(7)
     1.LE.0.OR.NNRSC(8).LE.0.OR.NNRSC(9).LE.0)RETURN
      CALL SEIZE(2,1)
      CALL SEIZE(3,1)
      CALL SEIZE(4,1)
      CALL SEIZE(7,1)
      CALL SEIZE(8,1)
      CALL SEIZE(9,1)
      IFLAG= -1
      RETURN
C
C     RULE 5- SEUB.IUT**^U*(Q*H,3,4,7 AND 8
C
    5 IF (NNRSC(2).LE.0.OR.NNRSC(3).LE.0.OR.NNRSC(4).LE.0.OR.NNRSC(7)
     1.LE.0.OR.NNRSC(8).LE.0)RETURN
      CALL SEIZE(2,1)
      CALL SEIZE(3,1)
      CALL SEIZE(4,1)
      CALL SEIZE(7,1)
      CALL SEIZE(8,1)
      IFLAG= -1
      RETURN
C
C     RULE 6- SEIZE RESOURCES 2,3,4,9,6 AND 7
```

```
C
     6 IF (NLE 10- SEIZE RESOURCES 3,4,6,7
C
    10 IF (NNRSC(3).LE.0.OR.NNRSC(4).LE.0.OR.NNRSC(6).LE.0.OR.NNRSC(7)
      1.LE.0)RETURN
       CALL SEIZE(3,1)
       CALL SEIZE(4,1)
       CALL SEIZE(6,1)
       CALL SEIZE(7,1)
       IFLAG= -1
       RETURN
C
C      RULE 11- SEIZE RESOURCES 3,5,6,7,8
C
    11 IF (NNRSC(3).LE.0.OR.NNRSC(5).LE.0.OR.NNRSC(6).LE.0.OR.NNRSC(7)
      1.LE.0.OR.NNRSC(8).LE.0)RETURN
       CALL SEIZE(3,1)
       CALL SEIZE(5,1)
       CALL SEIZE(6,1)
       CALL SEIZE(7,1)
       CALL SEIZE(8,1)
       IFLAG= -1
       RETURN
       END
```

APPENDIX F

Message Data

Code:
- 1 - Command Cell
- 2a/b - Current Operations Cell G3/G2
- 3 - Combat Service Support Cell
- 4 - Fire Support Cell
- 5 - Plans Cell
- 6 - Intelligence Cell
- X - Indirect via Division Message Center
- Y - Direct via FM Secure Radio
- A - Report Number
- B - Number of Times Sent Per Day
- C - Number of Senders
- D - Recieved by
- E - Informations Required by
- F - Time to Send in Minutes (Analog) (Triag Dist)
- G - Time to Send in Minutes (Digital) (Triag Dist)

Note: Reports corresponding with report numbers are shown on page F - 2.

A	B	C	D	E		F	G
9	2	1	2b	1,5,6	X	1.77,1.88,2.00	0.33,0.34,0.36
24	2	4	2a	1,3,4,5,6	Y	1.45,1.57,1.68	N/A
27	4	1	2a	1,3,4,5,6	X	1.27,1.37,1.47	0.23,0.24,0.26
57	1	1	2a	1,3,4,5,6	Y	0.93,1.03,1.13	N/A
66	1	9	3	1,2,5,6	X	1.10,1.20,1.30	0.18,0.20,0.22
1047	1	9	3	1,2,5	X	0.62,0.72,0.82	0.07,0.08,0.10
1041	1	1	2a	1,3,5	Y	1.22,1.32,1.42	N/A
1035	1	4	3	1,2,5	X	1.23,1.33,1.43	0.21,0.23,0.24
126	6	9	2a	1,3,4,5,6	Y	0.82,0.92,1.02	N/A
1067	1	1	2a	1,3,5	Y	1.30,1.40,1.50	N/A
1031	2	9	2a	1,3,4,5,6	Y	0.58,0.68,0.78	N/A
1025	1	1	3	1,2,4,5	X	0.95,1.03,1.13	0.14,0.16,0.18
116	1	2	2b	1,3,5,6	X	0.70,0.80,0.90	0.08,0.10,0.12
104	1	9	3	1,2,5	X	2.33,2.45,2.57	0.48,0.49,0.51
80	4	1	2a	1,3,4,5,6	X	0.62,0.72,0.82	0.07,0.08,0.10
59	4	9	2a	1,3,4,5,6	Y	1.48,1.60,1.72	N/A
35	2	1	2a	1,4,5	X	0.90,1.00,1.10	0.13,0.15,0.17
32	1	9	2a	1,5,6	X	0.73,0.83,0.93	0.09,0.11,0.13
61	1	1	3	1,2,5	X	0.62,0.72,0.82	0.07,0.08,0.10
55	1	9	2a	1,4,5	X	1.68,1.80,1.92	0.32,0.33,0.35
19	1	9	3	1,2,5	X	1.10,1.20,1.30	0.18,0.20,0.22
1100	4	9	3	1,2,5	Y	0.62,0.72,0.82	N/A
1091	4	9	2a	1,3,4,5,6	X	1.07,1.17,1.27	0.17,0.18,0.20
1081	1	9	2b	1,3,4,5,6	Y	0.72,0.82,0.92	N/A
1030	1	1	2b	1,3,4,5,6	X	0.73,0.83,0.93	0.09,0.11,0.13
1024	2	1	3	1,2,5	X	1.02,1.12,1.22	0.16,0.18,0.19
1013	2	1	2a	1,3,4,5,6	X	1.07,1.17,1.27	0.17,0.18,0.20
115	1	1	2a	1,3,5	X	3.85,3.97,4.12	0.83,0.87,0.90

Reports

Number	Name
9	Intelligence Summary Report
24	Air Defense Status Report
27	Chemical Downwind Message
57	Aviation Status Report
66	Prisoner of War Report
1047	Equipment Wrap Up Report
1041	Engineer Assessment Report
1035	Direct Support Maintenance Report
126	Unit Location Report
1067	NBC Defense Company Status Report
1031	Counter Fire Status Report
1025	Class V Report
116	Electronic Warfare Status Report
104	Personnel Situation Report
80	NBC Weather/Wind Report
59	Commander's Situation Report
35	Artillery Situation Report
32	Electronic Countermeasure Report
61	Loss Report
55	Air Request
19	Personnel Requirements Report
1100	Water Point Status Report
1091	Situation Update Report
1081	Radiation Status Report
1030	Communications Security Report
1024	Class III Report
1013	Artillery Update Report
115	Engineer Situation Report

APPENDIX G

Determination of Message Processing Time

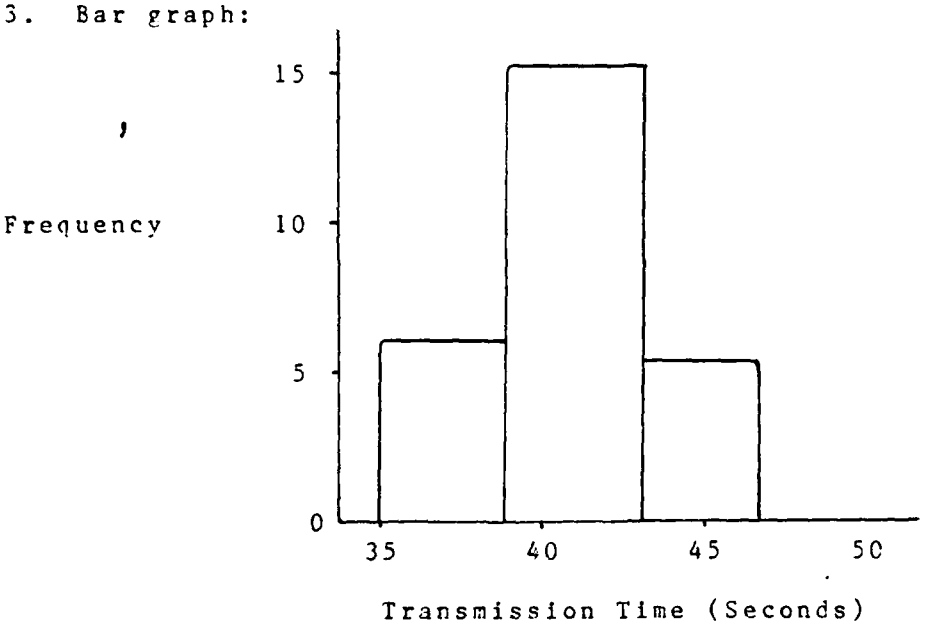
Message transmission time for analog and digital messages was determined by identifying the longest and shortest reports and transmitting them 25 times. A distribution was then fitted to this data. This data fit a triangular distribution which is identified by its mode and endpoints. By plotting the mode and endpoints for the shortest and longest reports, all other report transmission times could be read off the graph (page G - 3).

Example:

1. The shortest report was 4 lines long.
2. The observations for the analog transmission of this report in seconds were:

35	38	41	41	44
36	40	41	42	44
37	40	41	42	45
37	40	41	42	46
38	41	41	42	47

3. Bar graph:



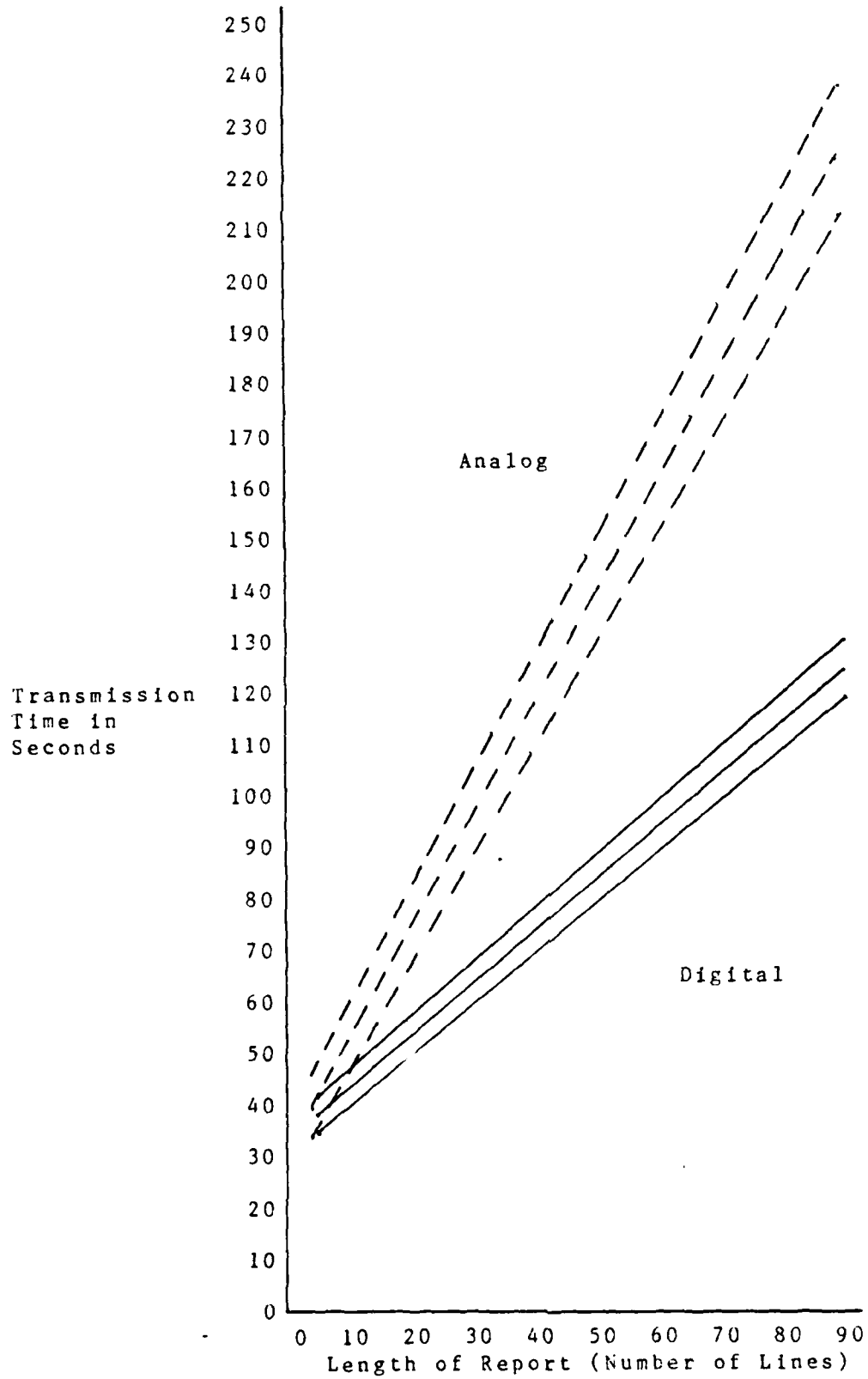
4. Hypothesis: Data is distributed Triangular(35,41,47)

5. Chi-Square test:

Interval	Observed Frequency	Expected Frequency	(Observed - Expected)^2 / Expected
35 - 39	6	5.13	0.148
39 - 43	14	14.7	0.033
43 - 47	5	5.13	0.003

chi-square (test) = 0.184

6. This value is not significant at the 0.05 level with 2 degrees of freedom. Therefore, the hypothesis cannot be rejected.

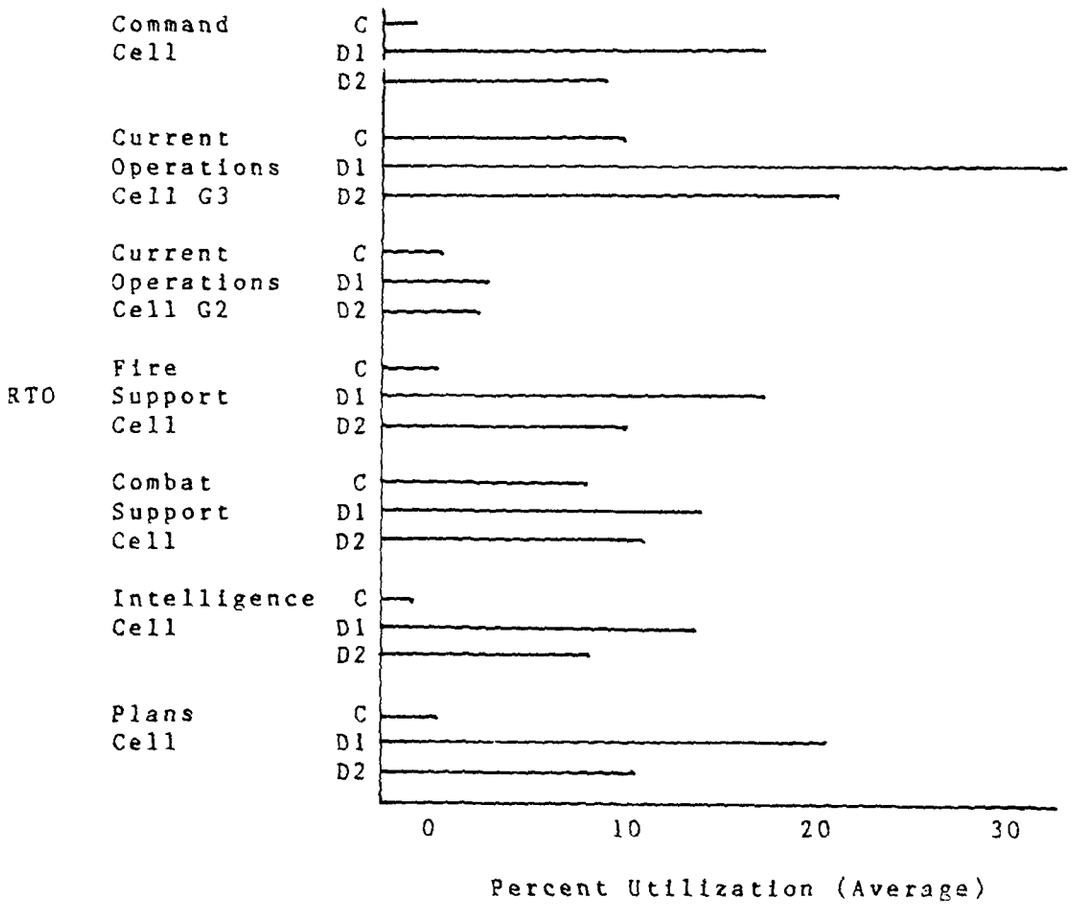

250
240
230
220
210
200
190
180
170
160
150
140
130
120
110
100
90
80
70
60
50
40
30
20
10
0
Transmission Time in Seconds
Analog
Digital
0 10 20 30 40 50 60 70 80 90
Length of Report (Number of Lines)

APPENDIX H

Percent Operator Utilization

This graph shows operator utilization results for each DTOC configuration. Regardless of DTOC configuration, the G3 current operations RTO has the greatest workload.

Key: C - Consolidated DTOC
D1 - Dispersed 1 DTOC
D2 - Dispersed 2 DTOC



APPENDIX I

Calculations

1. General formulas for ANOVA calculations.

$$Yi.. = \sum_{j=1}^{b} \sum_{k=1}^{n} Yijk$$

$$Y.j. = \sum_{i=1}^{a} \sum_{k=1}^{n} Yijk$$

$$Yij. = \sum_{k=1}^{n} Yijk$$

$$Y... = \sum_{i=1}^{a} \sum_{j=1}^{b} \sum_{k=1}^{n} Yijk$$

$$SSt = \sum_{i=1}^{a} \sum_{j=1}^{b} \sum_{k=1}^{n} (Yijk)^2 - (Y...)^2/abn$$

$$SSa = \sum_{i=1}^{a} (Yi..)^2/bn - (Y...)^2/abn$$

$$SSb = \sum_{j=1}^{b} (Y.j.)^2/an - (Y...)^2/abn$$

$$SSab = \sum_{i=1}^{a} \sum_{j=1}^{b} (Yij.)^2/n - (Y...)^2/abn$$

$$SSe = SSt - SSab - SSa - SSb$$

$$MSa = SSa/(a-1)$$

$$MSb = SSb/(b-1)$$

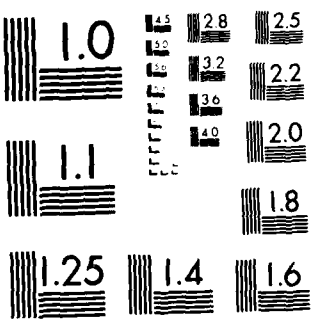
$$MSab = SSab/(a-1)(b-1)$$

$$MSe = SSe/ab(n-1)$$

$$Foa = MSa/MSe, \qquad Fob = MSb/MSe, \qquad Foab = MSab/MSe$$

AD-A172 439 AN EXAMINATION OF COMMUNICATIONS EFFICIENCY IN THE DISPERSED DIVISION TAC..(U) AIR FORCE INST OF TECH WRIGHT-PATTERSON AFB OH SCHOOL OF ENGI.. M A ENGLERT 2/2

UNCLASSIFIED MAR 86 AFIT/GSI/OS/86M-7 F/G 1/72 NL



2. ANOVA calculations for average message processing time (data shown on page 5 - 1).

Sum of Squares

SSt = [(14.09)^2 + (14.10)^2 +...+ (22.87)^2] - (396.77)^2/12
= 4876.5

SSa = [(195.75)^2 + (201.02)^2]/6 - (396.77)^2/12
= 2.3

SSb = [(60.5)^2 + (244.3)^2 + (91.44)^2]/4 - (396.77)^2/12
= 4871.9

SSab= [(28.19)^2 + (32.31)^2 +...+ (45.72)^2]/2 -
(396.77)^2/12
= 4871.9

SSe = 4876.5 - 2.2 - 2.3 - 4871.9 = 0.1

Mean Squares

MSa = 2.3/1 = 2.3, MSb = 4871.9/2 = 2435.9

MSab = 2.2/2 = 1.1, MSe = 0.1/6 = 0.02

Fo

Foa = 2.3/0.02 = 115.0 > 5.99 = F(critical)

Fob = 2435.9/0.02 = 121795.0 > 5.14 = F(critical)

Foab = 1.1/0.02 = 55.0 > 5.14 = F(critical)

3. Duncan's multiple range test for average message processing time.

General

S = (MSe/n)^0.5 = (0.02/2)^0.5 = 0.1

r.05(2,6) = 3.46, r.05(3,6) = 3.58

R2 = (3.46)(.1) = .346, R3 = (3.58)(.1) = .358

B fixed at level 1

(1) Y11.(mean) = 14.095

(2) Y21.(mean) = 16.155

(2) vs (1) = 16.155 - 14.095 = 2.06 > .346 (significant)

B fixed at level 2

(1) Y12.(mean) = 60.92

(2) Y22.(mean) = 61.495

(2) vs (1) = 61.495 - 60.92 = 0.575 > .346 (significant)

B fixed at level 3

(1) Y13.(mean) = 22.86

(2) Y23.(mean) = 22.86

(2) vs (1) = 22.86 - 22.86 = 0 < .346 (not significant)

A fixed at level 1

(1) Y11.(mean) = 14.095

(2) Y13.(mean) = 22.86

(3) Y12.(mean) = 60.92

(3) vs (1) = 60.92 - 14.095 = 46.825 > .358 (significant)

(3) vs (2) = 60.92 - 22.86 = 38.06 > .346 (significant)

(2) vs (1) = 22.86 - 14.095 = 8.765 > .346 (significant)

A fixed at level 2

(1) Y21.(mean) = 16.155

(2) Y23.(mean) = 22.86

(3) Y22.(mean) = 61.495

(3) vs (1) = 61.495 - 16.155 = 45.43 > .358 (significant)

(3) vs (2) = 61.495 - 22.86 = 38.635 > .346 (significant)

(2) vs (1) = 22.86 - 16.155 = 6.705 > .346 (significant)

4. ANOVA calculations for critical operator utilization (data shown on page 5 - 2).

Sum of Squares

SSt = [(9.12)^2 + (9.13)^2 +...+ (20.52)^2] - (243.55)^2/12
= 908.70078

SSa = [(121.78)^2 + (121.79)^2]/6 - (243.55)^2/12
= 0.00001

SSb = [(38.14)^2 + (123.39)^2 + (82.04)^2]/4 - (243.55)^2/12
= 908.7

SSab= [(19.07)^2 + (19.07)^2 +...+ (41.02)^2]/2 -
(243.55)^2/12
= 0.00002

Mean Squares

MSa = 0.00001/1 = 0.00001, MSb = 908.7/2 = 454.4

MSab= 0.00002/2 = 0.00001, MSe = 0.00075/6 = 0.00013

Fo

Foa = 0.00001/0.00013 = 0.07 < 5.99 = F(critical)

Fob = 454.4/0.00013 = 3634698.0 > 5.14 = F(critical)

Foab = 0.00001/0.00013 = 0.07 < 5.14 = F(critical)

5. Duncan's multiple range test for critical operator utilization.

General

$S = (MSe/n)^{0.5} = (0.00013/2)^{0.5} = .0081$

$r.05(2,6) = 3.46$, $r.05(3,6) = 3.58$

$R2 = (3.46)(.0081) = .028$ $R3 = (3.58)(.0081) = .029$

Results of ANOVA shows configuration is the only significant factor, therefore, only one test is required.

(1) Y11.(mean) = 9.125

(2) Y13.(mean) = 20.51

(3) Y12.(mean) = 30.845

(3) vs (1) = 30.845 - 9.125 = 21.72 > .029 (significant)

(3) vs (2) = 30.845 - 20.51 = 10.335 > .028 (significant)

(2) vs (1) = 20.51 - 9.125 = 11.385 > .028 (significant)

6. Calculations for excursion 1.

null hypothesis: mean1 = mean2, hypothesis1: mean1 < mean2

(Distance = 500 meters)

consolidated DTOC

sample mean1 = 14.095

sample variance1 = 0.00005

dispersed 1 DTOC w/ 2 RTO's

sample mean2 = 35.01

sample variance2 = 0.0002

$to = (14.095 - 35.01)/[(.00005/2 + .0002/2)^{.5}]$

$= -1870.69 < -2.92 = -t(.05,2)$

therefore; reject null hypothesis.

(Distance = 2000 meters)

consolidated DTOC

sample mean1 = 16.155

sample variance1 = 0.00005

dispersed 1 DTOC w/ 2 RTO's

sample mean2 = 35.065

sample variance2 = 0.00005

to = 916.155 - 35.065)/[(.00005/2 + .00005/2)^.5]

= -2674.28 < -6.314 = -t(.05,1)

therefore; reject null hypothesis.

7. Calculations for excursion 2.

null hypothesis: mean2 = mean1, hypothesis1: mean2 < mean1

(Distance = 500 meters)

consolidated DTOC

sample mean1 = 14.095

sample variance1 = 0.00005

dispersed 2 DTOC w/ one additional radio

sample mean2 = 13.045

sample variance2 = 0.00005

to = (13.045 - 14.095)/[(.00005/2 + .00005/2)^.5]

= -148.92 < -6.314 = -t(.05,1)

therefore; reject null hypothesis.

(Distance = 2000 meters)

consolidated DTOC

sample mean1 = 16.155

sample variance1 = 0.00005

dispersed 2 DTOC w/ one additional radio

sample mean2 = 13.045

sample variance2 = 0.00005

to = (13.045 - 16.155)/[(.00005/2 + .00005/2)^.5]

= -439.82 < -6.314 = -t(.05,1)

therefore; reject null hypothesis.

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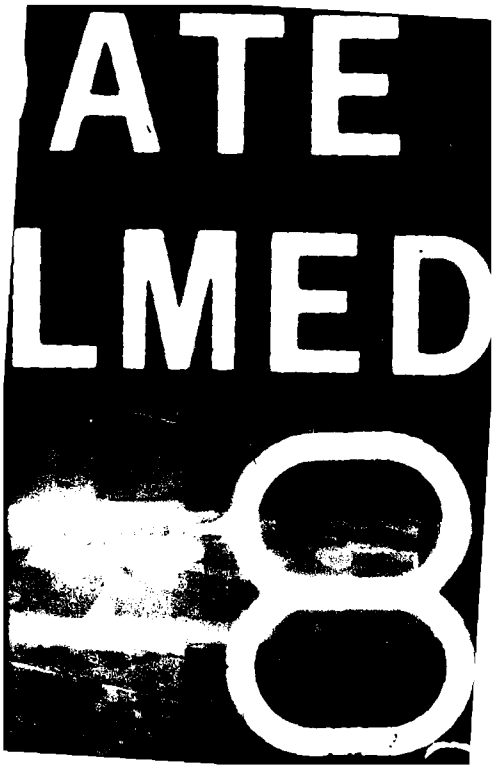
Abstract

This investigation determined the effects dispersing the division tactical operations center has on message processing time and radio telephone operator usage. The impact of dispersal distance and communications hardware are studied.

The analysis was accomplished by modeling division tactical operations center operations using SLAM, a special purpose simulation language, with FORTRAN inserts. The results of the study regarding the impact of dispersion was compared to similarly generated results of the present consolidated division tactical operations center.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